2013

Weed Control Guidelines

for

Mississippi

Mississippi State University Extension Service

Mississippi Agricultural and Forestry Experiment Station

If you wish to receive copies of the 2014 *Weed Control Guidelines for Mississippi,* complete and return the form below to

2014 *Weed Control Guidelines for Mississippi*
c/o John D. Byrd, Jr., Weed Specialist
Dept. of Plant and Soil Sciences
Box 9555
Mississippi State, MS 39762-9555

Copies may not be available if not ordered in advance.

Please send me ____ copies (at $10.00 each) of the publication, 2014 Weed Control Guidelines for Mississippi. Enclose check with order payable to Mississippi State University Extension Service and designate it 2013 Weed Control Guidelines.

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CONTRIBUTING GROUPS

This publication is the result of cooperative work by members of the Mississippi Weed Science Committee. This committee is composed of personnel from the following agencies:

1. Agricultural Research Service, U.S. Department of Agriculture
2. Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce
3. Mississippi Agricultural and Forestry Experiment Station
4. Mississippi State University Extension Service
5. Mississippi State University Forest and Wildlife Research Center
6. U.S. Army Corps of Engineers, Waterways Experiment Station

This publication is for the direction and guidance of agricultural workers. Specific and less technical information for various crops may be obtained at county offices of the Mississippi State University Extension Service.

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MISSISSIPPI WEED CONTROL GUIDELINES

Particular attention has been taken to ascertain that all herbicide treatments in this report are registered with the EPA for use in the manner described. Registrations for specific practices are frequently modified or deleted, often making it impossible for practices suggested in this report to remain current throughout the calendar year. Therefore, the manufacturer's label should be read and observed to prevent misuse of a herbicide. Some herbicide treatments or practices included herein are provided for through Special Local Need Registrations, Section 24(c). Use directions may be in the form of supplemental labeling, which must be in possession of the user at the time of use. Supplemental labeling for these special uses may be obtained from the dealer or registrant. It is not intended or proposed that any practice suggested in this guide be in violation of existing registration or manufacturer's label.

Precautions

All agricultural chemicals should be handled with care. The manufacturer's label on the container includes precautions for safe handling, which should always be observed. When material is spilled on the body, it should be washed off immediately. In no case, should spray tips be placed to the lips to blow out trash. Many of the materials are flammable and should be handled accordingly.

Aerial application of dicamba, picloram, 2,4-D, and other phenoxy or hormone-type herbicides is regulated by law in Mississippi. 2,4-D, dicamba, and/or MCPA may not be applied by fixed-wing aircraft between April 1 and September 30. 2,4-D and/or MCPA shall not be applied in any form to rice by helicopter between April 1 and September 30, except with special spray equipment and under certain conditions. Before aerial applications of such materials are made, operators should contact the Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce, Mississippi State, Mississippi, relative to compliance with this law and the regulations promulgated thereunder.

Clean spray tanks after the final application of a pesticide and before the application of another pesticide. Failure to clean the spray tank can result in severe crop injury or illegal residues in the harvested commodity. Most pesticide residues can be cleaned from the spray tank using household ammonia. Use clean water to rinse the inside of the spray tank. Use enough water to flush the spray boom hoses and spray tips.

Fill the spray tank with clean water; add enough ammonia to make a 1 percent solution (1 gallon ammonia per 100 gallons water). The ammonia used for cleaning should contain 3 percent active ingredient. Agitate the ammonia solution through the spray equipment and flush the hoses, booms, and nozzles for at least 15 minutes. When possible, allow sprayer to sit with this solution overnight before draining. Fill the tanks with clean water, agitate the water, and flush the boom with clean water for 5 minutes. Whenever possible, locate mix-load sites and equipment clean-up sites at least 100 feet from any surface water or from direct links to groundwater.

It is best not to use the same spraying equipment for applying both phenoxy-type herbicides, (2,4-D, etc.) and other pesticides unless the crop has good tolerance. Herbicides such as 2,4-D can be satisfactorily cleaned out of sprayers, but some risk still exists when spraying sensitive broadleaf crops.

Injury to fish, birds, honey bees, and mammals may be avoided in these ways:

1. Prevent drift of herbicides to wooded areas occupied by wildlife, drift to land areas not intended for treatments, and drift to bodies of water.
2. Prevent runoff or washoff by rain from treated areas to bodies of water through judicious timing of application.
3. Do not make applications too often or in excessive dosages.
4. Do not apply highly toxic herbicides.
5. Prevent carelessness.
6. Avoid treating extensive areas of water with approved aquatic herbicides in one operation, since the decaying vegetation that would result might deplete oxygen content of the water to the point of causing fish kills.
7. Comply with all restrictions specified on the pesticide label in the Endangered Species Act.

Herbicide Safety

Herbicides should always be handled in such a way that the possibility of harm to nontarget organisms (including man), either through contamination of food and water or by contact, is kept to a minimum. All users should be trained in the proper handling of herbicides and in following the precautions below:

1. Know the material being applied; READ THE CONTAINER LABEL AND UNDERSTAND THE DIRECTIONS for preparing and applying the herbicide, and FOLLOW THE DIRECTIONS.
2. Wear protective clothing specified on the pesticide label and avoid prolonged exposure to herbicides. Special care should be exercised to prevent inhalation and contamination of the skin when handling concentrates (use respirators, goggles, impermeable aprons, and gloves as specified on the label).
3. Avoid contamination of foods or drinking water of man and animals.
4. When herbicide contamination of the body occurs, wash the affected area quickly and thoroughly with soap and water. Wash with soap routinely after each day of spraying.
5. Keep spray equipment clean and in good condition.
6. STORE HERBICIDES IN PROPERLY LABELED CONTAINERS OUT OF REACH OF CHILDREN AND ANIMALS.
7. Dispose of empty containers safely (See Container Disposal Section).
8. **KNOW THE EMERGENCY MEASURES FOR TREATING ACCIDENTAL POISONING.** When illness arises due to a possible overexposure to a herbicide, contact your local physician. **Physicians and other medical authorities may obtain information on the toxicity of herbicides from the Poison Control Center, University Medical Center, Jackson, MS, telephone 1-800-222-1222.**
9. If herbicides get into the eyes, flush the eyes with plenty of water for 15 minutes and call a physician.
10. If a herbicide is swallowed, apply the first-aid treatment printed on the label of the container and call a physician.

Mixing and Handling Herbicides

1. Mix and prepare herbicides in the open or in a well-ventilated place. When handled in close quarters, highly toxic herbicides may cause poisoning through inhalation. Certain volatile herbicides may cause fires or explosions.
2. Open herbicide containers carefully to prevent billowing of dusts or splashing of liquids.
3. Pour herbicides carefully to avoid spills. Triple or pressure rinse empty containers and use the rinse water to fill the spray tank.
4. Use special containers — drums or pails — for mixing herbicides; never use food or beverage containers.
5. Never use your mouth to siphon a herbicide from a container.
6. Do not mix herbicides in concentrations higher than those recommended and measure accurately. This will help ensure application of correct and safe dosages.
7. Avoid spilling concentrates on the skin or clothes, and keep them away from the eyes, mouth, and nose. If a herbicide is spilled, wash it off with soap and water and change contaminated clothing immediately. Launder contaminated clothing before wearing it again. Launder contaminated clothing separately. Do not launder with family wash.
8. Always wear rubber gloves when handling concentrates. Rinse the gloves with water before removing them; do not turn gloves inside out when removing.
9. To safely mix and prepare some herbicides, it is necessary to wear a respiratory device and protective clothing. The container label will indicate if these precautions are needed.
10. Do not smoke, eat, or drink when handling herbicides.

Applying Herbicides

1. Wear the protective clothing prescribed on the container label when applying a herbicide.
2. Do not apply dosages greater than those recommended on the container label.
3. Time your applications to prevent illegal herbicide residues on food, feed, or forage crops; allow the prescribed number of days' interval between the last herbicide application and harvest or grazing.
4. Guard against drift of herbicides onto nearby crops, pastures, or grazing livestock, or onto streams, ponds, lakes, other fish-bearing waters, or other sensitive areas. Do not spray when environmental conditions favor drift. Use of the correct nozzle size, which maximizes the largest droplet size, will aid in minimizing spray drift.
5. Guard against runoff of herbicides into water supply sources. Do not mix or/apply herbicides near dug wells, cisterns, or any other water sources into which they may run or be washed by rain. Do not clean application equipment, dump unwanted herbicides, or dispose of empty containers near these places.
6. When applying spray or dust, work into the breeze or at a right-angle to it; thus, the herbicide will be blown away from instead of onto you.
7. Do not smoke, eat, or drink while applying herbicides.
8. Be careful not to rub eyes or mouth with your hands during applications.
9. If you should feel ill while applying herbicides, stop work at once and get medical attention.
10. At the end of a day's work, bathe and change all clothing. Launder the clothing before wearing it again. Launder contaminated clothing separately, not with family wash.
11. Rubber shoes may be cleaned with soap and water. It is impossible to efficiently decontaminate leather shoes. If your shoes have become heavily contaminated with herbicide, do not wear them again. Dispose of contaminated footwear properly.

Worker Protection Standard

1. Agricultural, forestry, nursery, and greenhouse users are affected by the Worker Protection Standard.
2. Requirements for Worker Protection Standard must be followed when they appear on the pesticide label. This includes providing personal protective equipment, observing restricted-entry intervals (REI), and notifying workers about areas where applications are taking place or where REI's are in effect. Notification may be oral or with signs posted at field entrances or both if required by the label.
3. Generic provisions of providing a decontamination facility, worker training, monitoring of handlers, cleaning, inspection, and maintenance of personal protective equipment, and notification of applications are required.
4. Training for noncertified pesticide handlers and applicators can be provided by: (1) a currently certified restricted-use pesticide applicator, (2) a person currently designated as a trainer of certified applicators or handlers by State, Federal, or Tribal agency having jurisdiction, or (3) a person having completed a "Pesticide Safety Train-The-Trainer" program approved by the State, Federal, or Tribal agency having jurisdiction. Reinforcement training about the specific pesticide being used should be conducted at the time the pesticide is to be handled or applied.
5. The employer must display at a central location information about each application, the name, telephone number, and address of the nearest emergency medical facility, and a WPS pesticide safety poster developed by EPA or an equivalent poster. He must also provide transportation to an emergency medical facility for the employee thought to have been poisoned or injured and supply the treating medical personnel any requested information from the product label. A description of the way the pesticide was used and the circumstances of the worker's exposure to the pesticide must also be given.

Suggestions for Disposal of Excess Pesticides and Pesticide Containers

Owners of excess pesticides should first exhaust the two following avenues before undertaking final disposal:

1. Use the pesticide for the purposes originally intended at the prescribed rate, providing these uses are currently legal.
2. Return pesticide to the manufacturer or distributor.

Recommended Procedures for Disposal of Excess Pesticides

The best way to dispose of excess pesticides is to apply the pesticide according to the label. Cancelled or suspended pesticides are classified as hazardous waste and must be disposed of at a hazardous waste facility. For information on disposal, contact:

Suggestions for Disposal of Excess Pesticides and Pesticide Containers (continued)

Mississippi Department of Environmental Quality
Bureau of Pollution Control
Division of Hazardous Waste Management
P. O. Box 10385
Jackson, MS 39289
Telephone (601) 961-5171

Recommended Procedures for Disposal of Pesticide Containers and Residues

Containers
Dispose of pesticide containers according to instructions on the pesticide label. As a general rule, (1) containers which held liquid pesticides should be triple or pressure rinsed and either offered for recycling or reconditioning, or disposed of in a permitted solid waste facility. (2) Containers which held dry materials should be completely emptied, triple or pressure rinsed if appropriate, and then either offered for recycling, reconditioning, or disposed of in a permitted solid waste facility.

For information on recycling pesticide containers contact your county Extension office.

Pesticide Residues
Rinsate from pesticide containers and spray equipment should be added to the spray or mix-tank as diluent and sprayed back on the field.

Open burning of pesticide containers is not permissible under Mississippi law.

Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers
Temporary storage of highly toxic or moderately toxic pesticides for the period immediately prior to, and of the quantity required for a single application, may be undertaken by the user at isolated sites and facilities where flooding is unlikely, where provisions are made to prevent unauthorized entry, and where separation from water systems and buildings is sufficient to prevent contamination by runoff, percolation, or wind-blown particles or vapors.

General Instructions for Use of Abbreviated Guides

1. Preplant and preemergence herbicide rates are generally related to soil texture and organic matter content. Some herbicides are suggested in these guidelines for a wide range of soil types (sandy to clays); whereas, others are suggested for only a few soil types. The soil organic matter content further defines use rates. Some times low contents prevent use, but generally, rates increase with increasing organic matter content.
2. If a single rate is recommended for a herbicide, use the recommended rate for all soil types and weed conditions described.
3. If a range of rates (2 to 4 lb for example) is recommended, select a rate from within the range in accordance with the size and condition of crop and weeds. For example, the lowest recommended rate of diuron plus surfactant should be used to control a very scattered infestation of newly emerged crabgrass in 6-inch cotton. In cotton more than 10 inches tall, the highest rate should be used if the problem consists mainly of crabgrass 2-3 inches tall and thickly spaced in the row.
4. If a range of rates (2 to 3 to 4 lb for example) is recommended for soil-applied herbicides, the specific rate should be chosen in accordance with soil texture and organic matter content of the soil. First, use the lower range for soils in the sandy textural class and the higher range for loams, clay loams, or, where recommended, for clays. Second, within either the low or high range select the specific rate in accordance with the organic matter content of the soil. Use the lower side of the range where organic matter is low and the higher side of the range where organic matter is high. Although exact knowledge concerning the organic matter content of soils is generally not available, there are several rough guides that can be used. Soils high in organic matter tend to darker and more easily cultivated than similar soils low in organic matter. Plants grown in high organic soils suffer less from drought than plants grown in similar soils with low organic matter. Soils of the Midsouth with less than one percent organic matter should be considered low in organic matter while those with 1.5 percent should be considered high in organic matter for purposes of herbicide use.

FACTORS TO CONVERT BROADCAST RATE/A TO A BAND RATE AT VARIOUS BAND AND ROW WIDTHS.

Band width inches	Row Spacing — Inches							
	20	24	28	30	32	36	38	40
6	0.3	0.25	0.21	0.20	0.19	0.17	0.16	0.15
8	0.4	0.33	0.29	0.27	0.25	0.22	0.21	0.20
10	0.5	0.42	0.36	0.33	0.31	0.28	0.26	0.25
12	0.6	0.50	0.43	0.40	0.37	0.33	0.31	0.30
14	0.7	0.58	0.50	0.47	0.44	0.39	0.37	0.35
16	0.8	0.67	0.57	0.53	0.50	0.44	0.42	0.40
18	0.9	0.75	0.64	0.60	0.56	0.50	0.47	0.45
20	1.0	0.93	0.71	0.67	0.62	0.56	0.53	0.50

How to Convert: Find the factor for row spacing and band width and multiply this by the broadcast rate.

For Example: The broadcast rate is 1.0 lb/acre, row spacing is 30 inches and band width is 10 inches—multiply .33 by 1.0 to get 0.33 lb/acre on a 10-inch band.

Caution - Noxious Weeds

The Mississippi Department of Agriculture and Commerce has the authority (under Section 69-25-1 through 69-25-47, Laws of Mississippi 1974) to regulate noxious weeds. A noxious weed is a plant species or classified group of plants declared by the Bureau of Plant Industry to be a public nuisance or to be especially injurious to the environment, to agricultural and horticultural production, or to wildlife, and which should be controlled and the dissemination of which prevented. The Mississippi Noxious Weed List and Quarantine information can be found in the regulation "Plant Diseases, Insects and Weeds" on the Bureau of Plant Industry Web site (www.mdac.state.ms.us → "Agency Information" → "Laws & Regulations" → "Bureau of Plant Industry").

MISSISSIPPI NOXIOUS WEEDS

Common Name	Scientific Name	Habitat
Benghal Dayflower	*Commelina benghalensis*	terrestrial
Brazilian Santintail	*Imperata braziliensis*	terrestrial
Chinese Tallow Tree	*Sapium sebiferum(Triadica sebifera)*	terrestrial
Cogongrass	*Imperata cylindrica*	terrestrial
Giant Salvinia	*Salvinia molesta*	aquatic
Hydrilla	*Hydrilla verticillata*	aquatic
Itchgrass	*Rottboellia cochinchinensis*	terrestrial
Kudzu	*Pueraria montana var. lobata*	terrestrial
Tropical Soda Apple	*Solanum viarum*	terrestrial

Also, the Mississippi Department of Agriculture and Commerce has the authority under the Mississippi Aquaculture Act of 1998 (Section 79-22-9, Laws of Mississippi 1974) to regulate the cultivation and marketing of certain aquatic products. In the "Guidelines for Aquaculture Activities" regulation, the department further defined permitting requirements for the importation, selling, possessing, or transporting of species that are detrimental to the state's native resources. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) and the Department of Marine Resources may advise MDAC in issuing cultivation and marketing permits (Section 49-7-80, Laws of Mississippi 1974). MDWFP determined the following species to be detrimental to the state's native resources. **Sales and distribution of the following species are prohibited in Mississippi**. The list of prohibited aquatic plants for sale and distribution can be found in the regulation "Guidelines for Aquaculture Activities" on the Bureau of Regulatory Services Web site (www.mdac.state.ms.us → "Agency Information" → "Laws & Regulations" → "Bureau of Regulatory Services").

AQUATIC PLANTS PROHIBITED FOR SALE AND DISTRIBUTION IN MISSISSIPPI

Common Name	Scientific Name	Habitat
Hydrilla (Florida Elodea)	*Hydrilla verticillata*	aquatic
Egeria (African Elodea)	*Egeria densa*	aquatic
Water Hyacinth	*Eichhornia crassipes*	aquatic
Rooted Hyacinth	*Eichhornia azurea*	aquatic
Eurasian Watermilfoil	*Myriophyllum spicatum*	aquatic
Water Lettuce	*Pistia stratiotes*	aquatic
Paperpark (Melaleuca)	*Melaleuca quinquenervia*	aquatic or wetland

A list of federal noxious weeds is available on the USDA Noxious Weeds Programs Web site (www.aphis.usda.gov/plant_health/plant_pest_info/weeds/). This list includes species or species groups that are not currently in the United States and present a real threat to agricultural, forest, urban, and natural areas. The list also includes species that are major weed problems elsewhere in the world and which currently have limited distributions in the United States. **Movement of any federal noxious weed, including seed and other propagules, into the United States and across state lines is prohibited**. See the Computer Aids section in this publication for additional Web sites about non-native invasive weeds.

FEDERAL NOXIOUS WEEDS OCCURRING IN ADJACENT STATES

Common Name	Scientific Name	Habitat	States
Duck-lettuce	*Ottelia alismoides*	aquatic	Louisiana
Cattail Grass	*Setaria pallide*	terrestrial	Louisiana
Fringed Dodder	*Cuscuta suaveolens*	terrestrial	Alabama
Kodomillet	*Paspalum scrobiculatum*	terrestrial	Alabama
Turkey Berry	*Solanum torvum*	terrestrial	Alabama

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
					lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Accord Concentrate[$]	Dow AgroSciences	4	5.4	Yes*		12	18	24	36	48
Accord SP[$]	Dow AgroSciences	3	4	No		16	24	32	48	64
Aqua Star[$]	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Aqua Neat[$]	Cerexagi (Riverdale)	4	5.4	Yes		12	18	24	36	48
Aquamaster[$]	Monsanto	4	5.4	Yes		12	18	24	36	48
Buccaneer	Tenkoz	3	4	Yes*		16	24	32	48	64
Buccaneer Plus*	Tenkoz	3	4	Yes*		16	24	32	48	64
ClearOut 41	Chemical Prod. Tech.	3	4	Yes		16	24	32	48	64
ClearOut 41 Plus*	Chemical Prod. Tech.	3	4	Yes*		16	24	32	48	64
ClearOut Pro Plus	Chemical Prod. Tech.	3	4	No		16	24	32	48	64
Cornerstone*	Agriliance	3	4	Yes*		16	24	32	48	64
Cornerstone Plus*	Agriliance	3	4	Yes*		16	24	32	48	64
Credit*	Nufarm	3	4	Yes*		16	24	32	48	64
Credit Extra*	Nufarm	3	4	No		16	24	32	48	64
Credit Duo*	Nufarm	3	3.97	Yes*		16	24	32	48	64
Credit Duo Extra*	Nufarm	3	3.97	No		16	24	32	48	64
Eagre[$]	Griffin	4	5.4	Yes		12	18	24	36	48
Foresters[$]	Riverdale	4	5.4	Yes*		12	18	24	36	48
Gly Star Plus*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star Pro*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star 5*	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Gly Star Original*	Albaugh (Agri Star)	3	4	Yes*		16	24	32	48	64
Gly-Flo	Micro-Flo	3	4	Yes*		16	24	32	48	64
Glyfos*	Cheminova	3	4	Yes*		16	24	32	48	64
Glyphos X-tra*	Cheminova	3	4	No		16	24	32	48	64
Glyfos Aquatic[$]	Cheminova	4	5.4	Yes		12	18	24	36	48
Glyfos Pro[$]	Cheminova	3	4	No		16	24	32	48	64
Glyphomax*	Dow AgroSciences	3	4	Yes*		16	24	32	48	64
Glyphomax Plus*	Dow AgroSciences	3	4	No		16	24	32	48	64
Glyphosate*	DuPont	3	4	Yes*		16	24	32	48	64
Glyphosate original*	Griffin	3	4	Yes*		16	24	32	48	64
Glyphosate VMF[$]	DuPont	4	5.4	Yes		12	18	24	36	48
Glyphosate 4*	Farmsaver.com	3	4	Yes		16	24	32	48	64
Glypro[$]	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Glypro Plus[$]	Dow AgroSciences	3	4	No		16	24	32	48	64

(continued)

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS *(continued)*

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
					lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Honcho	Monsanto	3	4	Yes*		16	24	32	48	64
Honcho Plus*	Monsanto	3	4	Yes*		16	24	32	48	64
Kleenup Pro[$]	United Hort. Supply	3	4	Yes*		16	24	32	48	64
Mad Dog*	AGSCO	3	4	Yes*		16	24	32	48	64
Mirage	Platte	3	4	Yes*		16	24	32	48	64
Mirage Plus*	Platte	3	4	Yes*		16	24	32	48	64
Polado L	Monsanto	4	5.4	Yes		12	18	24	36	48
Rattler	Helena	3	4	Yes*		16	24	32	48	64
Rattler Plus	Helena	3	4	Yes*		16	24	32	48	64
Razor[$]	Riverdale	3	4	Yes*		16	24	32	48	64
Razor Pro[$]	Riverdale	3	4	No		16	24	32	48	64
Rodeo[$]	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Roundup Original RT	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II CA*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Custom*	Monsanto	4	5.4	Yes		12	18	24	36	48
Roundup Ultra Max*	Monsanto	3.7	5	No		13	19	26	40	52
Roundup Pro[$]	Monsanto	3	4	No		16	24	32	48	64
Roundup Pro Concentrate[$]	Monsanto	3.7	5	No		13	19	26	40	52
Roundup UltraDry*	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup ProDry[$]	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup WeatherMax*	Monsanto	4.5	5.5	No		11	16	21	32	42
Silhouette	Agriliance	3	4	Yes*		16	24	32	48	64
Touchdown CF	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown Pro[$]	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown 5	Syngenta	3.4	5	No		14	21	28	42	56
Touchdown*	Syngenta	3	3.6	No		16	24	32	48	64

[1] Glyphosate products marked with "*" can be applied over-the-top of "Roundup Ready" crops. Please refer to glyphosate product label for specific restrictions.

[2] Glyphosate products marked with "$" are labeled for noncrop (aquatic, forestry, industrial, pasture, and/or turf) use only.

[3] Like many other herbicides, the glyphosate molecule is formulated as a salt. The weight of the active ingredient (a.i.) varies, depending on the chemical elements used to form that salt. The salt portion of the active ingredient does not contribute to actual weed control. Because the weight of the salt used in the different glyphosate formulations varies, a better measure among glyphosate products is the comparison of the actual amount of glyphosate, i.e. acid equivalent (a.e.). The a.e. rate measurement allows one to compare the actual glyphosate rate among the different salt formulations. The a.e. measurement is the only true method to compare glyphosate rates among the different salt formulations.

[4] Some formulations of glyphosate "*" contain some surfactant; however, additional surfactant is required with certain spray volumes. See product label for specific surfactant rates and uses.

PREPLANT WEED CONTROL OF WINTER ANNUAL WEEDS

Successful conservation tillage systems begin with good preplant weed-control programs. The steps for achieving a successful weed-control program are problem diagnosis, method evaluation, program selection, and program implementation. The diagnosis phase is probably the most important step when using these tillage systems. Without proper identification, unsuccessful weed control programs may be implemented, and, in some cases, complete crop loss could occur. Producers have few options to correct ineffective weed-control programs after planting and crop emergence.

More new and different weeds will occur in stale seedbed or no-till cropping systems than in conventional tillage systems. Many of these winter and early emerging spring and summer annuals are difficult to identify in early growth stages, and they become difficult to control by the time they are easily identifiable. Ideally, producers should know what species are present before using a herbicide, although a herbicide such as paraquat or glyphosate can control many plants that are not identified correctly. However, some species require special attention because they are not easily controlled by glyphosate or paraquat.

Producers using conventional tillage systems must become aware of key species that require specialized herbicide programs to avoid unsatisfactory or catastrophic results. Although not a complete list, the most commonly encountered species in the mid-South are shown in the table on the following page. The most difficult to control species in our geographic area are annual ryegrass, cutleaf eveningprimrose, curly dock, horseweed, Pennsylvania smartweed, and swinecress. The following table also shows the expected response of these and other species to commonly used herbicides and herbicide combinations. Weed responses in the table on the following page were compiled from a variety of sources and offer a relative comparison of control provided by different herbicides and combination. Some data should be considered preliminary data and were recorded as field observations without replicated field trials to verify their accuracy. In addition, the ratings provided may be lower than those expected with rates labeled for specific weeds. Overall, they reflect observations made over a wide variety of growing conditions, weed growth stages, and soil types. All of these are factors that affect herbicide performance. Therefore, use these expected responses as guidelines only and always refer to the herbicide label.

Few accurate generalizations can be made with regard to preplant weed control; however, the following may provide some insight to the data contained on the following page: (1) glyphosate and 2,4-D are most effective on small, actively growing weeds; (2) paraquat is most active on weeds that are either very young or have reached reproductive stages; (3) the addition of tank-mixture partners to glyphosate, with perhaps the exceptions of Goal, Harmony extra, and 2,4-D, tends to substantially antagonize (reduce) glyphosate's activity on grasses; (4) the addition of tank-mixture partners, particularly photosynthetic inhibitors, greatly enhances paraquat's performance.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual bluegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Eveningprimrose	Henbit	Prostrate knotweed	Shephardspurse	Wildlettuce	Virginia pepperweed	Vetch	Little Barley	Horseweed	Curly dock (seedling)	Curly dock (mature)	Ryegrass	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling Johnsongrass	Cocklebur	Entireleaf morningglory	Pitted morningglory	Smallflower morningglory	P. smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed	Sicklepod	Cutleaf groundcherry	Common ragweed	Red rice	Upright spurge	Cheat	Groundsel	Fall panicum	Rhizome Johnsongrass	Annual sedge	Purple nutsedge	Lambsquarters	Soil activity
Preplant – PPF*																																											
Sencor	9	10	9	7	10	6	8	6	9	8	6	6	10	5	5	-	6	7	8	7	7	8	7	7	7	7	8	9	8	8	8	7	7	8	4	4	-	-	-	-	-	-	yes
Scepter	3	8	9	5	9	5	7	5	9	7	-	4	3	4	3	-	2	2	3	3	3	6	10	5	6	7	7	0	3	2	10	5	3	8	2	2	-	-	-	-	-	-	-	yes
Goal 2XL/Delta Goal	9	10	9	8	8	4	9	9	9	9	8	7	-	6	9	-	5	-	-	-	-	-	8	8	9	9	8	9	9	8	9	-	-	-	-	9	7	7	-	-	-	-	-	yes
2,4-D	0	8	9	7	8	10	5	8	8	9	9	9	0	8	8	7	0	0	0	0	0	0	8	10	10	9	8	8	8	9	9	8	9	-	0	-	0	10	0	0	0	0	-	no
Clarity	0	9	9	8	9	8	9	8	9	9	9	9	0	8	9	7	0	0	1	1	1	0	10	9	9	9	9	9	8	9	8	8	9	9	0	9	0	8	0	0	0	0	8	no
Harmony Extra	0	9	9	8	8	8	7	-	9	9	9	9	0	6	10	9	0	0	0	0	0	0	8	7	8	8	-	6	4	-	8	4	-	-	0	-	0	-	0	0	-	-	9	no
Caparol/Cotton Pro	-	9	9	7	10	7	8	6	8	9	7	6	6	7	8	-	-	-	-	-	-	-	7	7	9	9	7	8	7	7	9	-	-	-	-	-	-	-	-	-	-	-	-	yes
Paraquat	10	10	10	7	10	7	9	6	9	7	7	8	8	8	7	4	8	9	9	9	8	9	6	5	5	7	6	6	6	8	9	9	7	8	7	8	9	9	-	-	-	-	-	no
Paraquat + Sencor	10	10	10	8	10	8	9	6	9	8	8	8	10	8	6	-	9	9	9	9	8	9	7	7	7	7	8	9	8	8	9	9	7	8	7	8	-	-	-	-	-	-	-	yes
Paraquat + Harmony Extra	9	10	10	10	10	8	9	-	10	-	5	9	10	7	9	7	5	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	no
Paraquat + Delta Goal/ Goal 2XL	10	10	10	10	10	7	9	-	10	-	5	9	10	8	7	5	6	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	9	-	9	-	-	-	-	-	yes
Paraquat + Clarity	10	10	10	9	10	9	8	-	9	-	7	10	9	9	9	7	6	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	no
Paraquat + 2,4-D	10	10	10	9	10	10	9	-	9	-	8	10	9	9	9	8	6	-	-	-	-	-	-	-	-	-	10	-	8	-	-	-	-	-	-	-	10	-	-	-	-	-	no
Glufosinate	6	-	-	8	10	7	6	-	-	-	9	8	7	9	-	6	8	8	8	8	8	9	10	10	10	9	8	8	7	-	8	7	-	-	-	-	-	-	-	-	-	-	-	no
Glyphosate	10	10	9	7	10	6	7	7	10	8	8	5	10	8	8	6	8	10	10	10	9	10	8	7	8	8	7	6	7	6	10	8	9	9	8	10	10	9	9	9	10	5	-	no
Glyphosate + 2,4-D	10	10	10	9	10	10	8	-	10	10	9	10	10	9	10	8	7	-	-	-	-	-	9	9	9	9	8	8	8	8	10	8	9	-	-	10	-	10	-	-	-	-	-	-	no
Glyphosate + Goal 2XL/ Delta Goal	10	10	10	8	10	7	9	-	10	-	10	7	10	8	8	7	8	9	9	9	8	9	8	9	9	9	8	10	9	9	10	8	9	9	-	10		9	8	8	-	-	-	yes
Glyphosate + Clarity	10	10	10	9	10	9	10	-	10	-	9	9	10	9	10	8	8	-	-	-	-	-	-	-	-	-	10	9	8	-	-	-	-	-	-	-	10	-	-	-	-	-	no
Glyphosate + Canopy XL	10	10	10	8	10	9	9	-	9	-	-	-	10	8	10	9	8	10	10	10	9	10	9	9	9	9	9	7	8	-	10	8	-	-	9	-	10	9	9	9	-	-	-	yes
Glyphosate + Harmony Extra	10	10	10	8	10	7	9	-	10	9	10	9	10	8	10	9	7	10	10	10	9	10	8	8	9	9	10	7	-	-	10	8	-	-	-	-	10	10	9	9	-	-	9	no
Glyphosate + Harmony GT	10	10	10	8	10	7	9	-	9	8	8	-	10	8	10	9	8	10	10	10	9	10	8	8	8	8	8	6	7	-	10	8	9	9	9	9	10	9	9	9	-	-	9	no
Glyphosate + Valor	10	10	10	8	10	9	9	-	9	-	-	-	10	8	-		9	10	10	10	9	10	8	8	8	8	9	-	-	-	10	8	9	9	9	10	10	9	9	9	-	-	-	yes

*Plus adjuvant if required according to label instructions.

HERBICIDE-RESISTANT WEEDS

Weed resistance is defined by the Weed Science Society of America (WSSA) as the inherited ability of a plant to survive and reproduce after exposure to a dose of herbicide normally lethal to the wild type. In a plant, resistance may be naturally occurring or induced by such techniques as genetic engineering or selection of variants produced by tissue culture or mutagenesis (WSSA). Repeated application(s) of the same herbicide or a different herbicide with similar mode of action on the same field growing season after growing season has contributed to the widespread occurrence of resistance to herbicides in several weed species around the world, in the U.S., and in Mississippi (see list below). Weed management programs must not be solely dependent on herbicides in order to be economically sustainable in the long term. In general, a combination of the following strategies is recommended:

(1) Use residual herbicides;

(2) Practice crop rotation;

(3) Rotate herbicides with different modes of action;

(4) Tank-mix herbicides with different modes of action at full recommended rates;

(5) Avoid sequential applications of the same herbicide continually;

(6) Utilize tillage, cultivation, and other cultural practices wherever and whenever feasible;

(7) Clean equipment thoroughly before and after each use; and

(8) Control weeds postharvest to reduce soil seedbank.

HERBICIDE-RESISTANT WEEDS IN MISSISSIPPI

Weed	Herbicide
Annual bluegrass	atrazine, simazine
Annual (Italian) ryegrass	diclofop, glyphosate, imazapic, imazapyr, mesosulfuron, metsulfuron, pyroxsulam, sulfometuron
Barnyardgrass/Junglerice	bispyribac, imazamox, imazethapyr, penoxsulam, propanil, quinclorac
Common cocklebur	MSMA, DSMA, imazaquin, imazethapyr
Giant ragweed	glyphosate
Goosegrass	DSMA, glyphosate, MSMA, pendimethalin, trifluralin
Horseweed (mare's-tail)	glyphosate, paraquat
Johnsongrass	fenoxaprop, fluazifop, glyphosate, pendimethalin, quizalofop, trifluralin
Palmer amaranth	glyphosate, pyrithiobac
Pigweed species	sulfometuron
Rice flatsedge	halosulfuron, imazethapyr
Spiny amaranth	glyphosate
Tall waterhemp	glyphosate

Management Options for Glyphosate-Resistant Weeds in Corn

These are suggested options for management of glyphosate-resistant weeds in corn. These are not the only options, but they have proven to be effective at managing glyphosate-resistant weeds in corn in Mississippi. Please see the overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds and their distribution in Mississippi.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Horseweed	Valor	2 oz/A	Fall to spring burndown but 30 days before planting conventional tillage corn; 1 inch or more of rain must occur between application and planting	Apply before horseweed emerges. If horse weed has emerged, add 2,4-D or dicamba to Valor. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mix ing with 2,4-D or dicamba..
Horseweed	2,4-D	Formulation dependent	Fall to spring burndown but 7 to 14 days before planting	Apply alone or with residual product listed above for control of horseweed emerged at time of application. 2,4-D provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
			May also be applied from emergence until corn reaches 8 inches	Postemergence applications of 2,4-D may cause some injury such as lodging, bending, and brittleness. Stalks remain brittle for 5 to 7 days after application, during which time they are susceptible to breakage by high winds and cultivation.
Horseweed	dicamba (Banvel, Clarity or other formulation)	Formulation dependent	Fall to spring burndown	Apply alone or with residual product listed above for control of horseweed emerged at time of application. Dicamba provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
			May also be applied any time from emergence until corn reaches 36 inches	Do not add crop oil concentrate to dicamba applied after crop emergence as crop injury may result.
Horseweed	Sharpen	2–3 oz/A, depending on soil texture	Fall to spring burndown up to corn emergence	**Horseweed should be less than 6 inches in height or diameter.** Sharpen may be applied with glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control. Always add methylated seed oil (MSO) at 1% v/v. Addition of AMS at 1% to 2% v/v is recommended. Do not apply more than 6 ounces per acre per season.
Horseweed	Liberty 280	22–36 oz/A	Fall to spring burndown but before corn emergence	Liberty 280 is often applied at planting as a salvage treatment. Level of control is depen-dent on size and age of horseweed, spray coverage, and air temperature. Daytime temperatures should be at least 70°F at application and for at least 3 to 4 days after application. **Liberty 280 may be applied postemergence to LibertyLink or Herculex corn hybrids.**
Horseweed	atrazine (4 lb/gal	1.5–2 qt/A liquid formulation)	Apply any time from 14 days before planting until corn reaches 12 inches	Atrazine is a restricted-use pesticide. It may be applied with glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Horseweed	Lexar	1.67–3 qt/A, depending on soil texture	Apply any time from 14 days before planting until corn reaches 12 inches	Lexar may be applied with glyphosate, paraquat, or Ignite to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Horseweed	Halex GT	3.6 pt/A	Apply any time from emergence until corn reaches 30 inches	Add nonionic surfactant at 0.25% v/v. The addition of atrazine may improve postemergence control. Application should be made before corn reaches 12 inches if atrazine is mixed with Halex GT.
Italian ryegrass	Dual Magnum	1.33–1.66 pt/A, depending on soil texture	Fall before Italian ryegrass emergence	Rate is soil-type dependent. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Italian ryegrass	clethodim (Select Max or 2 lb/gal formulation)	12–16 oz/A of Select Max or 6–8 oz/A of 2 lb/gal formulation	Apply to small Italian ryegrass before it exceeds 6 inches in height; apply in early burndown program (late January to early February); **do not apply within 30 days of corn planting**	**Multiple applications of clethodim are not recommended.** Do not apply under cold conditions. Daytime temperatures should be at least 60°F at application and for at least 3 to 4 days after application. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. **Sequential application of paraquat will be required if no fall residual was applied.**
Italian ryegrass	paraquat	3–4 pt/A of 2 lb/gal formulation or 2–2.67 pt/A of 3 lb/gal formulation	Apply to emerged Italian ryegrass; apply mid-February to early March	Spray volume is critical. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Avoid application with air induction nozzles. Paraquat does not provide residual control. Apply with atrazine to improve postemergence Italian ryegrass activity. **For spring burndown, paraquat should be applied 2 to 4 weeks after clethodim treatment if no fall residual was applied.**
Italian ryegrass	Zidua	2–4 oz/A, depending on soil texture	Fall, before Italian ryegrass emerges	Rate is soil-type dependent. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Palmer amaranth	atrazine (4 lb/gal liquid formulation)	1.5–2 qt/A	Apply any time from 14 days before planting until corn reaches 12 inches Atrazine is a restricted-use pesticide.	Atrazine is a restricted-use pesticide. It may be applied with glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control before corn emergence. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Palmer amaranth	Bicep II Magnum/Cinch ATZ	4.2–5.2 pt/A, depending on soil texture	After planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Palmer amaranth	Degree Xtra	2.9–3.7 qt/A, depending on soil texture	After planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth	Guardsman Max	2.5, 3, or 4 pt/A, depending on soil texture	After planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Palmer amaranth	Lexar	1.67–3 qt/A, depending on soil texture	After planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
		Sequential applications of 1.5–2 qt/A, followed by 1.25–1.75 qt/A	Before corn emergence, followed by application before corn reaches 12 inches	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Total Lexar rate should not exceed 3 quarts per acre in a single season.
Palmer amaranth	Callisto plus atrazine	3 oz/A plus 1.5 qt/A	Apply any time from emergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Total Callisto rate should not exceed 7.7 ounces per acre in a single season.
Palmer amaranth	Laudis plus atrazine	3 oz/A plus 1.5 qt/A	Apply any time from emergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add methylated seed oil (MSO) at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Total Laudis rate should not exceed 6 ounces per acre in a single season.
Palmer amaranth	Halex GT plus atrazine	3.6 pt/A plus 1.5 qt/A	Apply any time from emergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add nonionic surfactant at 0.25% v/v.
Palmer amaranth	dicamba (Banvel, Clarity or other formulation)	Formulation dependent	Apply any time from emergence until corn reaches 36 inches and to Palmer amaranth less than 4 inches	Do not add crop oil concentrate to dicamba applied after crop emergence as crop injury may result. Dicamba may be applied with glyphosate to improve grass and broadleaf weed control.
Palmer amaranth	2,4-D	Formulation dependent	Apply any time from emergence until corn reaches 8 inches	Postemergence applications of 2,4-D may cause some injury such as lodging, bending, and brittleness. Stalks remain brittle for 5 to 7 days after application, during which time they are susceptible to breakage by high winds and cultivation.
Palmer amaranth	Liberty 280	22 oz/A	Apply any time from emergence to V5 growth stage; Palmer amaranth should not exceed 3 to 6 inches	**Use only on Liberty Link corn.** Do not apply more than two applications per season. Sequential applications should be made 10 to 14 days apart. Apply in at least 10 gallons of water. Avoid application with air induction nozzles. Total Liberty 280 rate should not exceed 44 ounces per acre in a single season.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Johnsongrass (rhizome)	Accent	0.67–1.33 oz/A, depending on johnsongrass size at application	Apply to 12- to 18-inch johnsongrass	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. Do not make more than two applications of Accent in a single season.
Johnsongrass (rhizome)	Stout	0.5–0.75 oz/A, depending on johnsongrass size at application	Apply to 6- to 18-inch johnsongrass	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. Do not make more than one application of Stout in a single season.

Management Options for Glyphosate-Resistant Weeds in Cotton

These are suggested options for management of glyphosate-resistant weeds in cotton. These are not the only options, but they have proven to be effective at managing glyphosate-resistant weeds in cotton in Mississippi. Please see the overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds and their distribution in Mississippi.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Horseweed	diuron (4 lb/gal liquid formulation)	1, 2, or 3.2 pt/A, depending on soil texture	Fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D, dicamba, or Liberty 280 to diuron. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba. Use the higher rate on heavier-textured soils. **A postemergence application will likely be required for control of horseweed emerging in spring.**
Horseweed	Envoke	0.15 oz/A	Fall to spring burndown but 3 months before planting	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D, dicamba, or Liberty 280 to Envoke. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed	Valor	2 oz/A	Fall to spring burndown but 30 days before planting conventional tillage cotton; 1 inch or more of rain must occur between application and planting	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba to Valor. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Horseweed	2,4-D	Formulation dependent	Fall to spring burndown but 30 days before planting	Apply alone or with residual product listed above for control of horseweed emerged at time of application. 2,4-D provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
Horseweed	dicamba (Banvel, Clarity or other formulation)	Formulation dependent	Fall to spring burndown; must wait at least 21 days before planting cotton following 1 inch or more of rain after application	Apply alone or with residual product listed above for control of horseweed emerged at time of application. Dicamba provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
Horseweed	Sharpen	1 oz/A	Fall to spring burndown; must wait at least 42 days before planting cotton following 1 inch or more of rain after application	**Horseweed should be less than 4 inches in height or diameter.** Sharpen may be applied with glyphosate, paraquat, or Liberty 280 to improve grass and broadleaf weed control. Always add methylated seed oil (MSO) at 1% v/v. Addition of AMS at 1% to 2% v/v is recommended. Do not apply more than 2 ounces per acre per season.
Horseweed	Liberty 280	22–36 oz/A	Fall to spring burndown but before cotton emergence	Liberty 280 is often applied at planting as a salvage treatment. Level of control is dependent on size and age of horseweed, spray coverage, and air temperature. Daytime air temperatures should be at least 70°F at application and for at least 3 to 4 days after application.
Italian ryegrass	Dual Magnum	1.33–1.66 pt/A, depending on soil texture	Fall before Italian ryegrass emergence	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Italian ryegrass	trifluralin (4 lb/gal formulation)	1.5–2 pt/A	Fall before Italian ryegrass emergence	Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.
Italian ryegrass	clethodim (Select Max or 2 lb/gal formulation)	12–16 oz/A of Select Max or 6–8 oz/A of 2 lb/gal formulation	Apply to small Italian ryegrass before it exceeds 6 inches in height; apply in early burndown program (late January to early February)	**Multiple applications of clethodim are not recommended.** Do not apply under cold conditions. Daytime temperatures should be at least 60°F at application and for at least 3 to 4 days after application. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. **Sequential application of paraquat will be required if no fall residual was applied.**
Italian ryegrass	paraquat	3–4 pt/A of 2 lb/gal formulation or 2–2.67 pt/A of 3 lb/gal formulation	Apply to emerged Italian ryegrass; apply in mid-February to early March	Spray volume is critical. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Avoid application with air induction nozzles. Paraquat does not provide residual control. Apply with diuron to improve postemergence Italian ryegrass activity. **For spring burndown, paraquat should be applied 2 to 4 weeks after clethodim treatment if no fall residual was applied.**
Palmer amaranth	Valor	2 oz/A	30 days before planting conventional tillage cotton; 1 inch or more of rain must occur between application and planting	Control is dependent on activation of herbicide and level of weed infestation. Valor only provides residual control and does not control emerged weeds. Apply with paraquat at 0.5 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. **An at-planting application of residual herbicide will be required for in-season Palmer amaranth control.**
Palmer amaranth	Reflex or Dawn	1 pt/A	Before or after planting but before cotton emergence on coarse-textured soils; up to 21 days before planting but **after at least 0.5 inch of rain on medium- or fine-textured soils**	Residual control is dependent on activation of herbicide and level of weed infestation. Apply with paraquat at 0.5 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Some crinkling or spotting of cotton foliage may occur. **An at-planting application of residual herbicide will be required for in-season Palmer amaranth control if beds are disturbed before planting.**
Palmer amaranth	trifluralin (4 lb/gal formulation)	1–1.5 pt/A	Preplant incorporated; in-season control optimized with applications immediately before planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours. In-season Palmer amaranth control may be improved by surface application of residual herbicide after planting.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth	fluometuron (4 lb/gal liquid formulation)	2, 3, or 4 pt/A, depending on soil texture	After planting but before cotton emergence	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Palmer amaranth	Prowl H_2O or 3.3 EC pendimethalin formulation	1, 1.5, or 2.1 pt/A Prowl H_2O or 1.2, 1.75, or 2.4 pt/A 3.3 EC formulation, depending on soil texture	After planting but before cotton emergence	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Palmer amaranth	metolachlor/S-metolachlor	Formulation dependent	Postemergence to 1- to 2-leaf cotton	Dual Magnum only provides residual control and does not control emerged weeds. Residual control is dependent on activation of herbicide and level of weed infestation. Apply with glyphosate or Sequence (premixture of glyphosate and S-metolachlor) alone. See the metolachlor entry in the cotton section for rates.
Palmer amaranth	prometryn (4 lb/gal liquid formulation)	1 pt/A	Postdirected once or twice after cotton is 3 inches tall	Avoid contact with cotton foliage. Prometryn provides some residual control in addition to controlling emerged weeds. Apply with MSMA at 1 pound of active ingredient per acre to improve control of emerged Palmer amaranth.
Palmer amaranth	diuron (4 lb/gal liquid formulation)	1.6 pt/A	As layby when cotton is at least 12 inches tall and after the last cultivation	Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve control of emerged Palmer amaranth and other weeds. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.
Palmer amaranth	Valor	2 oz/A	As layby when cotton is at least 16 inches tall and after the last cultivation	**Multiple applications of Group 14 herbicides (Valor, Reflex, Dawn) in a single season are not recommended.** Application should be directed at the bottom 2 inches of cotton. Valor only provides residual control and does not control emerged weeds. Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve control of emerged Palmer amaranth and other weeds.
Palmer amaranth	Reflex or Dawn	1 pt/A	As layby when cotton has at least 4 inches of bark and after the last cultivation	**Multiple applications of Group 14 herbicides (Valor, Reflex, Dawn) in a single season are not recommended.** Application should be directed at the bottom 2 inches of cotton. Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve control of emerged Palmer amaranth and other weeds. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Palmer amaranth	Gramoxone SL	2 pt/A	As late-season salvage application under hooded sprayer	**Apply by directing spray between rows using a hooded sprayer to prevent contact with cotton foliage.** Spray volume is critical. Paraquat should be applied in at least 15 gallons of water and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. This treatment does not provide residual control. Apply with diuron to improve postemergence Palmer amaranth activity and provide residual control.
Palmer amaranth	Liberty 280	29 oz/A	Postemergence from emergence to early bloom; Palmer amaranth should not exceed 3 to 6 inches	**Use only on Liberty Link cotton.** Do not apply more than 72 to 87 fluid ounces per acre in two or three applications, respectively. The maximum total application rate is dependent on whether Liberty 280 was applied at burndown, as well as the application rate at that time. Sequential applications should be made 10 to 14 days apart. Apply in at least 10 gallons of water. Avoid application with air induction nozzles. Apply with Dual Magnum in the first application for residual control of Palmer amaranth.
Johnsongrass (rhizome)	clethodim (Select Max or 2 lb/gal formulation)	12–32 oz/A of Select Max or 6–16 oz/A of 2 lb/gal formulation 9–24 oz/A of Select Max or 6–12 oz/A of 2 lb/gal formulation for repeat application to control regrowth	Any time to emerged johnsongrass	Apply to johnsongrass before it reaches 25 inches. Reduced level of control can be expected on larger johnsongrass. Apply a sequential application to regrowth after the first application if needed, but apply to johnsongrass no larger than 18 inches. Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Johnsongrass (rhizome)	Assure II	10 oz/A for single application followed by 7 oz/A for control of regrowth	Apply to 10- to 24-inch johnsongrass and 6- to 10-inch johnsongrass for sequential application	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Johnsongrass (rhizome)	Fusilade DX	12 oz/A followed by 8 oz/A to control regrowth	Apply to johnsongrass up to 18 inches with 12 oz/A rate and up to 12 inches for sequential application	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Johnsongrass (rhizome)	Poast Plus	24 oz/A followed by 24 oz/A to control regrowth	Apply to johnsongrass up to 20 inches with 24 oz/A rate and up to 10 inches with sequential application	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Goosegrass	clethodim (Select Max or 2 lb/gal formulation)	9–16 oz/A of Select Max or 6–8 oz/A of 2 lb/gal formulation	Goosegrass with 2 to 6 inches of lateral growth	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Goosegrass	Assure II	7–8 oz/A	Goosegrass with 2 to 6 inches of lateral growth	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Goosegrass	Fusilade DX	8 oz/A	Goosegrass up to 4 inches with no more than 6 leaves	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Goosegrass	Poast Plus	24 oz/A	Goosegrass up to 6 inches	Apply in at least 10 gallons of water by ground. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.

Management Options for Herbicide-Resistant Weeds in Rice

These are suggested options for management of herbicide-resistant weeds in rice. These are not the only options, but they have proven to be effective at managing herbicide-resistant weeds in rice in Mississippi. Please see the herbicide resistance summary in this section for details on existing herbicide-resistant weeds and their distribution in Mississippi. Glyphosate-resistant weeds such as horseweed and Italian ryegrass are problematic for burndown programs in Mississippi rice. Barnyardgrass resistant to propanil and/or quinclorac is common in Mississippi; however, its geographic distribution within the state is not fully understood. Barnyardgrass resistant to Newpath (ALS-resistant barnyardgrass) and rice flatsedge resistant to Permit (ALS-resistant rice flatsedge) have been identified in isolated fields in Mississippi.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate-resistant horseweed	Valor	2 oz/A	Fall to spring burndown but 30 days before planting; 1 inch or more of rain must occur between application and planting	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D to Valor. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D.
Glyphosate-resistant horseweed	2,4-D	Formulation dependent	Fall to spring burndown but 30 days before planting	Apply alone or with Valor for control of horseweed emerged at time of application. 2,4-D provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
Glyphosate-resistant horseweed	Sharpen	1–2 oz/A	Fall to spring burndown but 15 days before planting	**Horseweed should be less than 4 inches in height or diameter.** Sharpen may be applied with glyphosate, paraquat, or Ignite to improve grass and broadleaf weed control. Always add methylated seed oil (MSO) at 1% v/v. Addition of AMS at 1–2% v/v is recommended. Do not apply more than 2 ounces per acre per season. Do not apply within 45 days of flooding.
Glyphosate-resistant horseweed	Liberty 280	22–36 oz/A	Fall to spring burndown but before rice emergence	Liberty 280 is often applied at planting as a salvage treatment. Level of control is dependent on size and age of horseweed, spray coverage, and air temperature. Daytime air temperatures should be at least 70°F at application and for at least 3 to 4 days after application.
Glyphosate-resistant horseweed	Propanil (4 lb/gal liquid formulation) plus quinclorac	4 qt/A plus 75 DF at 0.5 lb/A or equivalent rate of liquid formulation	Apply any time after rice emergence; horseweed should be less than 6 inches	See the rice section for instructions on application of propanil and quinclorac. Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Propanil plus quinclorac will not completely control horseweed until the field is flooded.
Glyphosate-resistant horseweed	Grasp	2.3 oz/A	Apply any time after rice emergence; horseweed should be less than 6 inches	See the rice section for instructions on application of Grasp. Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Grasp will not completely control horseweed until the field is flooded.
Glyphosate-resistant Italian ryegrass	Command	2 pt/A	Fall before Italian ryegrass emergence	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate-resistant Italian ryegrass	clethodim (Select Max or 2 lb/gal formulation)	12–16 oz/A of Select Max or 6–8 oz/A of 2 lb/gal formulation	Apply to small Italian ryegrass before it exceeds 6 inches in height; apply in early burndown program (late January to early February); do not apply within 30 days of rice planting	**Multiple applications of clethodim are not recommended**. Do not apply under cold conditions. Daytime temperatures should be at least 60°F at application and for at least 3 to 4 days after application. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Sequential application of paraquat will be required if no fall residual was applied.
Glyphosate-resistant Italian ryegrass	paraquat	3–4 pt/A of 2 lb/gal formulation or 2–2.67 pt/A of 3 lb/gal formulation	Apply to emerged Italian ryegrass; apply in mid-February to early March	Spray volume is critical. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Avoid application with air induction nozzles. Does not provide residual control. For spring burndown, paraquat should be applied 2 to 4 weeks after clethodim treatment if no fall residual was applied.
Propanil/quinclorac-resistant barnyardgrass and ALS-resistant barnyardgrass	Command	0.8–1.6 pt/A, depending on soil texture	After planting but before rice emergence	See the rice section for instructions on application of Command. Use the higher rate on heavier-textured soils. Apply with glyphosate if barnyardgrass is emerged at application. Do not add glyphosate if rice is emerged at application.
			Apply postemergence when rice has 1 or 2 leaves	Command provides no postemergence control. Include Clincher SF or Ricestar HT to control emerged barnyardgrass.
Propanil/quinclorac-resistant barnyardgrass and ALS-resistant barnyardgrass	Prowl H_2O or 3.3 EC pendimethalin formulation	1.6–2.1 pt/A Prowl H_2O or 1.84–2.4 pt/A 3.3 EC formulation, depending on soil texture	After rice seed have imbibed water for germination	See the rice section for instructions on application of pendimethalin. Use the higher rate on heavier-textured soils. Pendimethalin provides no postemergence control. Include Clincher SF or Ricestar HT to control emerged barnyardgrass.
Propanil/quinclorac-resistant barnyardgrass and ALS-resistant barnyardgrass	Ricestar HT	24 oz/A	Apply to emerged barnyardgrass that does not exceed the 4-leaf stage any time from 2-leaf rice to early tillering stage	Soil moisture is critical for good activity. Flush the field before application if soil is dry. Weed foliage must not be covered with water at time of application. Ricestar HT provides no residual control of barnyardgrass. Add Command or pendimethalin for residual control after application. (Quinclorac is also an effective tank-mix for Ricestar HT if barnyardgrass is not resistant to quinclorac.)
Propanil/quinclorac-resistant barnyardgrass and ALS-resistant barnyardgrass	Clincher SF	15 oz/A	Apply to emerged barnyardgrass that does not exceed the 4-leaf stage any time from in 1-leaf rice to early tillering stage	Soil moisture is critical for good activity. Flush the field before application if soil is dry. Weed foliage must not be covered with water at time of application. Clincher SF provides no residual control of barnyardgrass. Add Command or pendimethalin for residual control after application. Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. **This treatment may be applied post-flood; however, these applications should be considered emergency salvage treatments.**

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Propanil/quinclorac-resistant barnyardgrass	Regiment	0.4–0.67 oz/A, depending on barnyardgrass size	Apply to emerged barnyardgrass any time from 3-leaf rice to 0.5-inch internode elongation	See the Regiment label for a list of adjuvants approved by Valent. Regiment provides no residual control of barnyardgrass. Add Command or pendimethalin for residual control after application. (It may also be tank-mixed with quinclorac if barnyardgrass is not resistant to quinclorac.) **This treatment may be applied postflood; however, these applications should be considered emergency salvage treatments.**
Propanil/quinclorac-resistant barnyardgrass	Grasp	2–2.8 oz/A, depending on application timing	Apply any time from rice emergence until 60 days before harvest	See the rice section for instructions on application of Grasp. Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Grasp provides no residual control of barnyardgrass. Add Command or pendimethalin for residual control after application. (It may also be tank-mixed with quinclorac if barnyardgrass is not resistant to quinclorac.) **This treatment may be applied postflood; however, these applications should be considered emergency salvage treatments.**
Propanil/quinclorac-resistant barnyardgrass	Newpath	4–6 oz/A	Apply any time from preplant incorporated until rice is flooded	**Use on Clearfield rice varieties and hybrids only.** See the rice section for instructions on application of Newpath. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Applications made preplant incorporated, preemergence, or to 1- to 2-leaf rice should be followed by a second application of Newpath or Beyond before flooding.
Propanil/quinclorac-resistant barnyardgrass	Clearpath	0.5 lb/A	Apply any time from preplant incorporated until 1-leaf rice	**Use on Clearfield rice varieties and hybrids only.** See the rice section for instructions on application of Clearpath. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Clearpath must be followed by an application of Newpath or Beyond before flooding.
Propanil/quinclorac-resistant barnyardgrass	Beyond	5–6 oz/A	Apply any time from 4-leaf rice until 14 days after panicle initiation on Clearfield varieties and from 4-leaf rice to panicle initiation on Clearfield hybrids	**Use on Clearfield rice varieties and hybrids only.** See the rice section for instructions on application of Beyond. Add crop oil concentrate at 1% v/v. Beyond may be substituted for the second application of Newpath, but two applications are required before flooding. **Beyond may be applied postflood; however, these applications should be considered emergency salvage treatments.**
ALS-resistant barnyardgrass	propanil (4 lb/gal liquid formulation)	3–6 qt/A, depending on barnyardgrass size	Apply to emerged barnyardgrass that does not exceed the 4-leaf stage	See the rice section for instructions on application of propanil. Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. Propanil provides no residual control of barnyardgrass. Add Command, pendimethalin, or quinclorac for residual control after application.
ALS-resistant barnyardgrass	quinclorac	75 DF at 0.33–0.67 lb/A or equivalent rate of liquid formulation, depending on barnyardgrass size	Apply any time from planting until 40 days before harvest	See the rice section for instructions on application of quinclorac. Add crop oil concentrate at 1 quart per acre for postemergence applications. Apply with Command or pendimethalin for additional residual control. Apply with propanil, Ricestar HT, or Clincher SF for additional postemergence control. **This treatment may be applied postflood; however, these applications should be considered emergency salvage treatments.**

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
ALS-resistant barnyardgrass	RiceBeaux	4 qt/A	Postemergence when barnyardgrass has 1 to 3 leaves	See the rice section for instructions on application of RiceBeaux. Soil should be moist at time of application and not allowed to crack after application. RiceBeaux works best as a component of a barnyardgrass program including preemergence and postemergence applications of other herbicides.
ALS-resistant rice flatsedge	Basagran	1.5–2 pt/A, depending on rice flatsedge size	Apply to emerged rice flatsedge and at least 24 hours before rice is flooded	See the rice section for instructions on application of Basagran. Apply in at least 10 gallons of water with crop oil concentrate at 1% v/v. Do not apply to submerged weeds. The addition of propanil may improve rice flatsedge control. A sequential application may be utilized, but total Basagran rate should not exceed 4 pints per acre in a single season.
ALS-resistant rice flatsedge	propanil (4 lb/gal liquid formulation)	3–6 qt/A, depending on rice flatsedge size	Apply to emerged rice flatsedge	See the rice section for instructions on application of propanil. Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. The addition of Basagran may improve rice flatsedge control.
ALS-resistant rice flatsedge	RiceBeaux	4 qt/A	Apply to emerged rice flatsedge	See the rice section for instructions on application of RiceBeaux. Soil should be moist at time of application and not allowed to crack after application. Sequential applications with Basagran and/or propanil may be needed for complete control.

Management Options for Glyphosate-Resistant Weeds in Soybean

These are suggested options for management of glyphosate-resistant weeds in soybean. These are not the only options, but they have proven to be effective at managing glyphosate-resistant weeds in soybean in Mississippi. Please see the overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds and their distribution in Mississippi.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate-resistant horseweed	Valor XLT	3 oz/A	Fall to spring burndown but before soybean emergence	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If 2,4-D or dicamba is applied in the spring, see label for soybean plant-back restrictions. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Valor XLT in the soybean preemergence section for additional information.
Glyphosate-resistant horseweed	Gangster	2.4 oz/A (2 oz Valor + 0.4 oz FirstRate). Sold as a co-pack	Fall to spring burndown but before soybean emergence	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If 2,4-D or dicamba is applied in the spring, see label for soybean plant-back restrictions. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Gangster in the soybean preemergence section for additional information.
Glyphosate-resistant horseweed	Canopy	4–6 oz/A	Fall to spring burndown up to planting	Apply before horseweed emerges. If horse weed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If 2,4-D or dicamba is applied in the spring, see the label for soybean plant-back restrictions. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Canopy in the soybean preemergence section for additional information.
Glyphosate-resistant horseweed	Envive	3 oz/A	Fall to spring burndown up to planting	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Envive in the soybean preemergence section for additional information.
Glyphosate-resistant horseweed	Canopy EX	2 oz/A	Fall to spring burndown up to 7 days before planting	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Canopy EX in the soybean preemergence section for additional information.
Glyphosate-resistant horseweed	Valor	2 oz/A	Fall to spring burndown but before soybean emergence	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. See Valor in the soybean preemergence section for additional information.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate-resistant horseweed	FirstRate	0.75 oz/A	Fall to spring burndown but before crop emerges	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant. Do not exceed 1.05 ounces per acre in a single season.
Glyphosate-resistant horseweed	Python	1–1.33 oz/A	Up to 30 days before planting but before soybean emergence	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba product to control existing horseweed that emerged before application. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Glyphosate-resistant horseweed	2,4-D	Formulation dependant	Fall to spring burndown but 7 to 30 days before planting, depending on formulation	Apply alone or with residual product listed above for control of horseweed emerged at time of application. This option does not provide residual control of horseweed. It is often applied with glyphosate or glyphosate + residual herbicide in a spring burndown program.
Glyphosate-resistant horseweed	dicamba Banvel, (Clarity, or other formulation)	Formulation dependant	Fall to spring burndown; must wait at least 30 days before planting soybean after 1 inch or more of rain after application	Apply alone or with residual product listed above for control of horseweed emerged at time of application. This option does not provide residual control of horseweed. Often applied with glyphosate or glyphosate + residual herbicide in a spring burndown program.
Glyphosate-resistant horseweed	Ignite	22–36 fl oz/A	Fall to spring burndown but before soybean emergence	Ignite is often applied at planting as a salvage treatment. Level of control is dependent upon size and age of horseweed, spray coverage, and air temperature. Daytime air temperature should be at least 70°F at application and for at least 3 to 4 days after application.
Glyphosate-resistant horseweed	FirstRate	0.3–0.6 oz/A	From planting up to 50% flowering soybean	FirstRate can be applied over the top of soybean and horseweed at 0.3 ounce per acre. A second application of 0.3 ounce can be applied 10 to 14 days after first application to control existing weeds and provide longer residual activity. A single application of 0.6 ounce per acre can be applied under extreme weed pressure. Do not exceed 1.05 ounces per acre in a single season. Apply at least 10 gallons of water per acre.
	or			
	glyphosate + FirstRate	Formulation dependent + 0.3 to 0.6 oz/A	From planting up to 50% flowering soybean	If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. However, improved control has been observed when an additional adjuvant is used along with the adjuvant in the preloaded glyphosate formulation.
Glyphosate-resistant horseweed	Sharpen	1–2 oz/A	Fall to spring burndown but before soybean emergence	Horseweed should be less than 6 inches in diameter or height. Sharpen will provide some residual control of horseweed. It may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Always add 1% v/v methylated seed oil (MSO). Addition of AMS at 1–2% w/v water is recommended. Severe crop injury will occur if you apply when soybean has reached cracking stage or after emergence. Use the 1-ounce rate when it is less than 30 days before planting. Do not apply preemergence to coarse soils. Do not apply more than 2 ounces per season.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate-resistant horseweed	Synchrony XP	1.125 oz/A (STS soybean only)	**STS soybean only**: at planting to early postemergence over the top of STS soybean	Synchrony XP may provide inconsistent and incomplete control or suppression only. Using this treatment repetitively across years likely will lead to development of resistance to ALS herbicides such as Synchrony XP. For use only on STS soybean varieties when applying the 1.125-ounce rate postemergence.
	or			
	glyphosate + Synchrony XP	Formulation dependant + 1.125 oz/A (STS soybean only)	**STS soybean only**: at planting to early postemergence over the top of STS soybean	If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. However, improved control has been observed when an additional adjuvant is used along with the adjuvant in the preloaded glyphosate formulation.
Glyphosate-and ALS-resistant Italian ryegrass	Boundary	2 pt/A	In the fall (Sept. 1 through Nov. 30) after harvest of the previous crop	Paraquat should be tank-mixed with this application to ensure removal of emerged plants. Do not apply more than 3.9 pints per acre per growing season.
Glyphosate- and ALS-resistant Italian ryegrass	Dual Magnum	1.33–1.66 pt/A	Fall before ryegrass emergence	The rate is soil-type dependant; see the table in the Dual Magnum entry in the soybean preemergence section for rate information. If applied after ryegrass has emerged, apply with at least 3 pints per acre of Gramoxone Inteon. Gramoxone Inteon should be applied in at least 15 gallons of water by ground and with 1% crop oil or 0.25% nonionic surfactant.
Glyphosate- and ALS-resistant Italian ryegrass	Command	1.33–2.66 pt/A	Fall before ryegrass emergence	If applied after ryegrass has emerged, apply with at least 3 pints per acre of Gramoxone Inteon. Gramoxone Inteon should be applied in at least 15 gallons of water by ground and with 1% crop oil or 0.25% nonionic surfactant. Command has a 9-month rotation restriction for corn. See the label for more instructions.
Glyphosate- and ALS-resistant Italian ryegrass	Gramoxone Inteon	2.5–4 pt/A	Control existing Italian ryegrass; apply before soybean emergence — will kill emerged soybean	Apply to control emerged Italian ryegrass. Spray volume is critical. Apply in at least 15 gallons of water per acre. Avoid air induction nozzles. Does not provide residual control. Add 1% crop oil or 0.5% nonionic surfactant.
Glyphosate- and ALS-resistant Italian ryegrass	Select Max	9–16 fl oz/A	Apply to small Italian ryegrass before it exceeds 6 inches in height; apply in an early burndown program (late January to early March)	Do not apply under cold conditions. Daytime air temperature should be at least 60°F at application and for at least 3 to 4 days after application. Add 0.25% nonionic surfactant or 1% crop oil if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Glyphosate-and ALS-resistant Palmer amaranth	Authority MTZ	8–18 oz/A	Before planting but before soybean emergence	Injury to soybean can occur if rainfall occurs soon after crop emergence, especially on sandy or silt loam soils. Authority MTZ provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. Authority MTZ does not control existing weeds; it provides only residual control. See Authority MTZ in the preemergence section for additional information.
Glyphosate-and ALS-resistant Palmer amaranth	Authority XL	3–8 oz/A	Before planting but before soybean emergence	Injury to soybean can occur if rainfall occurs soon after crop emergence, especially on sandy or silt loam soils. Authority XL provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. Authority XL does not control existing weeds; it provides only residual control. See Authority XL in the preemergence section for additional information.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate- and ALS-resistant Palmer amaranth	Valor	2 oz/A	Within 30 days of planting but before crop emergence	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Valor provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. It only provides residual control and does not control existing weeds. See Valor in the soybean preemergence section for additional information.
Glyphosate- and ALS-resistant Palmer amaranth	Valor XLT	3 oz/A	Prior to or after planting but before soybean emergence.	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Valor XLT provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. It only provides residual control and does not control existing weeds. See Valor XLT in the soybean preemergence section for additional information.
Glyphosate- and ALS-resistant Palmer amaranth	Envive	3 oz/A	Prior to or after planting but before soybean emergence.	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Envive provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. It only provides residual control and does not control existing weeds. See Envive in the soybean preemergence section for additional information.
Glyphosate- and ALS-resistant Palmer amaranth	Gangster	2.4 oz/A (2 oz Valor + 0.4 oz FirstRate). Sold as a co-pack	Prior to or after planting but before soybean emergence.	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Gangster provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. It only provides residual control and does not control existing weeds. See Gangster in the soybean preemergence section for additional information.
Glyphosate- and ALS-resistant Palmer amaranth	Canopy	4–6 oz/A	Prior to or after planting but before soybean emergence.	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Canopy provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. It only provides residual control and does not control existing weeds. See Canopy in the soybean preemergence section for additional information.
Glyphosate- and ALS-resistant Palmer amaranth	Prefix or **POST application:** Prefix + glyphosate	2 pt/A **POST application:** 2 pt/A + recommended glyphosate rate according to product label	At planting but before crop emergence **POST application:** Apply when soybean has one to three trifoliate leaves	Injury to soybean can occur if rain falls soon after crop emergence, especially on sandy or silt loam soils. Prefix provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation. Prefix provides primarily residual control, but it also provides partial control of existing Palmer pigweed, with level of control dependent upon weed size (should have no more than four leaves). Glyphosate can be added to control existing vegetation.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
Glyphosate- and ALS-resistant Palmer amaranth	metolachlor/ S-metolachlor	Formulation dependant	At planting	This option provides only residual control. See the metolachlor entry in the soybean preemergence section for rates.
	or			
	POST application: metolachlor + glyphosate or Sequence	**POST application:** Dependent on formulation (see specific labels) or 2.5–3 pt/A of Sequence	**POST application:** From soybean planting through third soybean trifoliate growth stage	Apply with glyphosate or Sequence (premixture of glyphosate + S-metolachlor) alone. Add 0.25% nonionic surfactant when applying glyphosate with metolachlor. No additional adjuvant is needed when applying Sequence. Metolachlor or S-metolachlor provides residual control of Palmer pigweed into the growing season but not season-long control. Control is dependent upon activation of herbicide and level of weed infestation.
Glyphosate- and ALS-resistant Palmer amaranth	Reflex or Flexstar	1–1.5 pt/A	Apply over the top of soybean any time prior to 45 days before soybean harvest	Rate applied depends on weed size. Apply 1 to 1.25 pints per acre before Palmer pigweed has more than four true leaves. Apply 1.5 pints before Palmer pigweed has more than six true leaves. Marginal control can be expected when Palmer pigweed exceeds the six-leaf growth stage. Add 0.25% nonionic surfactant. Spray coverage is critical; apply in at least 15 gallons of water per acre.
	or			
	Glyphosate + Reflex or Flexstar	Glyphosate rate dependent upon formulation (see specific glyphosate label for rate) + 6–12 fl oz/A of Reflex or Flexstar	Apply over the top of soybean any time prior to 45 days before soybean harvest	When applying with a glyphosate formulation preloaded with an adjuvant, an additional adjuvant is not required. When applying with a glyphosate formulation not preloaded with a glyphosate formulation, add 0.25% nonionic surfactant.
Glyphosate-resistant johnsongrass (rhizome)	Select Max	12–32 fl oz/A	Anytime to emerged Johnsongrass	Apply to Johnsongrass before it reaches 25 inches in height. Reduced level of control can be expected on larger Johnsongrass.
		9–24 fl oz/A for repeat application to control regrowth		Apply a follow-up application to regrowth after first application if needed, but apply to Johnsongrass no larger than 18 inches in height. Apply in at least 10 gallons of water by ground. Add 0.25% nonionic surfactant or 1% crop oil if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Glyphosate-resistant johnsongrass (rhizome)	Assure II	10 fl oz/A for single application followed by 7 fl oz/A for control of regrowth	Apply to 10- to 24-inch Johnsongrass and 6- to 10-inch Johnsongrass for the sequential application	Add 0.25% nonionic surfactant or 1% crop oil to spray solution. Apply in at least 10 gallons of water per acre. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required by label.
Glyphosate-resistant johnsongrass (rhizome)	Fusilade DX	12 fl oz/A followed by 8 fl oz/A to control regrowth	Apply to Johnsongrass up to 18 inches tall with 12 fl oz/A rate and up to 12 inches tall with the follow-up application	Add 0.25% nonionic surfactant or 1% crop oil to spray solution. Apply in at least 10 gallons of water per acre. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required by label.
Glyphosate-resistant johnsongrass (rhizome)	Poast Plus	24 fl oz/A followed by 24 fl oz/A to control regrowth	Apply to Johnsongrass up to 20 inches tall with 24 fl oz/A rate and up to 10 inches tall with the follow-up application	Add 1% crop oil to the spray solution. Apply in at least 10 gallons of water per acre. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required by label.

Management Options for Glyphosate-Resistant Weeds in Wheat

These are suggested options for the management of herbicide-resistant weeds in wheat. These are not the only options, but they have proven to be effective in both managing herbicide-resistant weeds and preventing further resistance development. Please see the overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds and their distribution in Mississippi.

Weed	Herbicide(s)	Rate	Timing of application	Special instructions
ALS- and AC Case-resistant Italian ryegrass	Axiom	5–10 oz/A	May be applied after wheat has fully germinated up to 2-leaf stage and before weed emergence	This product contains metribuzin, to which some wheat varieties have shown sensitivity. See Axiom in the postemergence section of Small Grains for additional information.
ALS- and AC Case-resistant Italian ryegrass	Metribuzin	2–8 oz/A	May be applied after wheat has reached 2-leaf growth stage but before jointing	Some wheat varieties have shown sensitivity to metribuzin. The metribuzin rate depends on wheat growth stage. Multiple applications are allowed per season, but a minimum of 21 days between applications is required. See metribuzin in the postemergence section of Small Grains for additional information.
ALS- and AC Case-resistant Italian ryegrass	Axial XL	16.4 oz/A	Apply from 2-leaf to preboot stage wheat. Apply to 1-leaf to 2-tiller ryegrass.	Only one application is allowed per growing season. See Axial XL in postemergence section of Small Grains for additional information

HERBICIDE MODE OF ACTION

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
A	Inhibition of acetyl CoA carboxylase (ACCase)	Aryloxyphenoxy-propionate "FOPs"	clodinafop-propargyl cyhalofop-butyl diclofop-methyl fenoxaprop-P-ethyl fluazifop-P-butyl	1
		Cyclohexanedione "DIMs"	clethodim sethoxydim tralkoxydim	
		Phenylpyrazoline "DEN"	pinoxaden	
B	Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	Sulfonylurea	chlorimuron-ethyl chlorsulfuron foramsulfuron halosulfuron-methyl iodosulfuron mesosulfuron metsulfuron-methyl nicosulfuron primisulfuron-methyl prosulfuron rimsulfuron sulfosulfuron thifensulfuron-methyl tribenuron-methyl trifloxysulfuron	2
		Imidazolinone	imazapic imazamox imazapyr imazaquin imazethapyr	
		Triazolopyrimidine	cloransulam-methyl diclosulam florasulam flumetsulam penoxsulam pyroxsulam	
		Pyrimidinyl(thio)benzoate	bispyribac-Na pyrithiobac-Na	
C1	Inhibition of photosynthesis at photosystem II	Triazine	atrazine prometon propazine simazine	5
		Triazinone	hexazinone metribuzin	
		Uracil	bromacil terbacil	

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
C2	Inhibition of photosynthesis at photosystem II	Urea	diuron fluometuron (see F3) linuron siduron tebuthiuron	7
		Amide	propanil	
C3	Inhibition of photosynthesis at photosystem II	Nitrile	bromoxynil	6
		Benzothiadiazinone	bentazon	
D	Photosystem-I-electron diversion	Bipyridylium	diquat paraquat	22
E	Inhibition of protoporphyrinogen oxidase (PPO)	Diphenylether	acifluorfen-Na fomesafen lactofen oxyfluorfen	14
		N-phenylphthalimide	flumioxazin flumiclorac-pentyl	
		Thiadiazole	fluthiacet-methyl	
		Oxadiazole	oxadiazon	
		Triazolinone	carfentrazone-ethyl sulfentrazone	
F1	Bleaching: Inhibition of carotenoid biosynthesis at the phytoene desaturase step (PDS)	Pyridazinone	norflurazon	12
		Other	fluridone	
F2	Bleaching: Inhibition of 4-hydroxyphenyl-pyruvate-dioxygenase (4-HPPD)	Triketone	mesotrione	27
		Isoxazole	isoxaflutole	
F3	Bleaching: Inhibition of carotenoid biosynthesis (unknown target)	Isoxazolidinone	clomazone	13
		Urea	fluometuron (see C2)	
G	Inhibition of EPSP synthase	Glycine	glyphosate	9
H	Inhibition of glutamine synthetase	Phosphinic acid	glufosinate-ammonium	10
I	Inhibition of DHP (dihydropteroate) synthase	Carbamate	asulam	18
K1	Microtubule assembly inhibition	Dinitroaniline	benefin ethalfluralin oryzalin pendimethalin trifluralin	3
		Pyridine	dithiopyr thiazopyr	
		Benzamide	propyzamide = pronamide	
		Benzoic acid	DCPA = chlorthal-dimethyl	

HRAC group	Site of action	Chemical family	Active ingredient	WSSA group
K3	Inhibition of VLCFAs (see Remarks) (Inhibition of cell division)	Chloroacetamide	acetochlor alachlor butachlor dimethanamid metolachlor	15
			pyroxasulfone	
		Acetamide	napropamide	
		Oxyacetamide	flufenacet	
L	Inhibition of cell wall (cellulose) synthesis	Nitrile	dichlobenil	20
		Benzamide	isoxaben	21
N	Inhibition of lipid synthesis (not ACCase inhibition)	Thiocarbamate	EPTC thiobencarb	8
		Phosphorodithioate	bensulide	
		Benzofuran	ethofumesate	
O	Action like indole acetic acid (synthetic auxins)	Phenoxy-carboxylic-acid	2,4-D 2,4-DB MCPA	4
		Benzoic acid	dicamba	
		Pyridine carboxylic acid	clopyralid fluroxypyr picloram triclopyr	
		Quinoline carboxylic acid	quinclorac	
P	Inhibition of auxin transport	Phthalamate	naptalam	19
		Semicarbazone	diflufenzopyr	
Z	Unknown herbicide mode of action	Organoarsenical	DSMA MSMA	17
		Other	dazomet fosamine metam oleic acid pelargonic acid	

COTTON

Better control of a wide spectrum of weeds, including grasses and broadleaf weeds, can be obtained using two herbicides: one applied preplant incorporated and the other applied preemergence at rates specified on the label. A complete weed control program also requires timely applications of herbicides postemergence while weeds are small.

Follow fungicide recommendations whenever preemergence herbicides are used in cotton. Plant seed at least 0.5 inch deep and cover well with soil. If replanting is necessary, do not re-treat with any herbicide.

Substituted urea herbicides such as diuron and fluometuron used in combination with organophosphate systemic insecticides at planting may injure cotton.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual Bluegrass	Bittercress	Buttercup	Carolina Geranium	Chickweed	Cheat	Eveningprimrose	Groundsel	Henbit	Prostrate Knotweed	Shepherdspurse	Wildlettuce	Virginia Pepperweed	Vetch	Little Barley/Car. Foxtail	Horseweed[2]	Curly Dock (seedling)	Italian Ryegrass[3]	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass[4]	Seedling Johnsongrass	Cocklebur	Entireleaf Morng	Pitted Morng	Smallflower Morng	P. Smartweed	Hemp Sesbania	Prickly Sida	Spurred Anoda	Palmer Amaranth[5]	Sicklepod	Cutleaf Groundcherry	Common Ragweed	Red Rice	Upright Spurge	Soil Activity
Preplant - Foliar[1]																																					
Dicamba	0	**8**	**9**	**8**	**8**	0	**10**	**-**	7	**8**	**8**	**9**	**9**	**9**	0	**9**	**9**	0	0	1	1	1	0	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**9**	**9**	**9**	**9**	**9**	0	**9**	yes
Firstshot	0	**9**	**9**	**8**	**8**	0	**8**	**-**	7	-	**9**	**9**	**9**	**9**	0	6	**10**	0	0	0	0	0	0	**8**	7	**8**	**8**	-	6	4	-	6	4	-	-	0	-	no
Glyphosate	**10**	**10**	**9**	7	**10**	**9**	6	**9**	7	7	**10**	**8**	**8**	5	**10**	**8**	6	6	**10**	**10**	**10**	**8**	**9**	**8**	7	**8**	**8**	7	6	7	5	**9**	**8**	**9**	**9**	**8**	**9**	no
Glyphosate + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**8**	**10**	**9**	**10**	**10**	**9**	**9**	**8**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**8**	**9**	**9**	**9**	**10**	**8**	**9**	no
Glyphosate + dicamba	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**9**	**10**	**9**	**10**	**10**	**9**	**9**	**9**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**9**	**9**	**9**	**9**	**9**	**10**	**8**	**9**	yes
Glyphosate + dicamba + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**10**	**10**	**9**	**10**	**10**	**9**	**9**	**9**	**9**	6	**10**	**10**	**10**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**9**	**9**	**9**	**9**	**10**	**8**	**9**	yes
Glyphosate + Sharpen	**10**	**10**	**9**	7	**10**	**9**	7	-	7	7	**10**	**9**	**8**	5	**10**	**9**	**9**	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	**8**	7	7	6	**10**	**8**	**9**	**9**	**8**	**10**	yes
Goal 2XL	**9**	**10**	**9**	**8**	**8**	7	4	7	**9**	**9**	**9**	**9**	**8**	7	-	6	**9**	5	-	-	-	-	-	**8**	**8**	**9**	**9**	**8**	**9**	**9**	**8**	**9**	-	-	-	-	**9**	yes
Liberty 280	6	-	-	**8**	**10**	-	7	-	6	-	-	-	**9**	**8**	7	**9**	6	6	**8**	**8**	**8**	5	**9**	**10**	**10**	**10**	**9**	**8**	**8**	7	-	**8**	7	-	-	-	-	no
Paraquat	**10**	**10**	**10**	7	**10**	**8**	7	**9**	**9**	6	**9**	7	7	**8**	**8**	6	**8**	**8**	**9**	**9**	**9**	**8**	**9**	6	7	7	7	5	6	6	**8**	**9**	**9**	7	**8**	7	**8**	no
Prometryn	-	**9**	**9**	7	**10**	**-**	7	-	**8**	6	**8**	**9**	7	6	6	7	**8**	-	-	-	-	-	-	7	7	**9**	**9**	7	**8**	7	7	**9**	-	-		-	-	yes

[1]Plus approved adjuvant according to label instructions.

[2]Horseweed resistance to Group 9 (glyphosate) and Group 22 (paraquat) herbicides is prevalent across Mississippi.

[3]Italian ryegrass resistance to Group 2 (Envoke, Firstshot, Staple) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[4]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.

[5]Palmer amaranth resistance to Group 2 (Envoke, Firstshot, Staple) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED[1]

Herbicides[2]	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Goosegrass[3]	Johnsongrass-rhizome[4]	Johnsongrass-seedling[4]	Fall panicum	Annual sedge	Nutsedge – purple	Nutsedge – yellow	Annual morningglory	Cocklebur	Hemp sesbania	Honeyvine milkweed	Nodding spurge	Palmer, spiny amaranth, tall waterhemp[5]	Pigweed, smooth, redroot	Prickly sida	Purslane	Sicklepod	Smartweed	Spurred anoda	Velvetleaf	Crop tolerance
Preplant[6]																									
Pendimethalin	**9**	0	**9**	**9**	**9**	5	**9**	**9**	0	0	0	3	0	0	0	1	7	**8**	0	**9**	1	2	0	0	G
Reflex	4	0	3	4	4	0	4	-	7	3	7	4	7	3	0	2	**9**	**9**	7	7	4	-	1	1	G
Trifluralin	**9**	0	**9**	**9**	**9**	6	**9**	**9**	0	0	0	3	0	0	0	1	**8**	**8**	0	**9**	1	2	0	0	G
Preemergence[6]																									
Command	**9**	-	**9**	**9**	**9**	3	**9**	**8**	-	-	-	2	6	4	-	**8**	2	2	**9**	**9**	0	**8**	**9**	**10**	F
Diuron	7	0	**8**	**8**	**8**	0	6	**8**	**9**	0	0	7	4	4	0	6	**9**	**9**	6	**9**	5	7	2	7	F
Fluometuron	7	0	**8**	**9**	**8**	0	6	7	**9**	0	0	7	**8**	6	0	3	**8**	**8**	**9**	**9**	6	7	3	6	G
Staple LX[7]	5	-	5	5	5	2	5	-	-	-	-	**8**	4	4	-	**9**	6	**8**	**9**	-	6	7	**9**	**8**	G
Solicam DF	**8**	2	**8**	**9**	**8**	2	7	7	**9**	4	4	5	3	3	0	7	7	7	**9**	**9**	4	6	**8**	7	G
Postemergence directed																									
Aim	0	0	0	0	0	0	0	0	0	0	0	**8**	7	6	0	7	6	6	6	-	4	-	-	**10**	G
MSMA	7	0	**8**	**8**	4	5	**8**	7	6	6	6	3	**9**	2	1	0	5	6	2	3	3	1	0	0	G
Cobra	3	0	3	3	3	2	3	3	2	-	2	6	**8**	-	5	**8**	**8**	**8**	**8**	**8**	-	7	7	**8**	G
+ MSMA	**8**	0	**8**	**8**	**8**	5	**9**	7	6	6	6	**9**	**9**	7	5	**8**	**9**	**9**	**8**	**9**	5	7	7	**8**	F
Fluometuron	6	-	6	6	6	-	6	6	-	1	1	7	5	4	-	-	6	6	5	-	-	-	-	-	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**8**	**8**	**8**	6	6	**8**	**9**	5	2	4	**9**	**9**	7	6	**8**	4	3	6	F
Goal 2XL	4	0	4	4	4	2	4	4	2	2	2	**9**	**8**	-	2	7	7	7	**8**	**9**	-	**9**	-	**8**	G
+ MSMA	**8**	0	**8**	**8**	**8**	5	**9**	7	6	6	6	**9**	**9**	7	2	7	**9**	**9**	**8**	**9**	**8**	**9**	5	**8**	F
Linex	5	0	5	5	5	2	5	5	4	0	0	**8**	7	**8**	2	6	7	7	**8**	**8**	7	4	5	6	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**9**	**9**	7	2	6	**9**	**9**	**9**	**8**	**8**	4	5	7	G
Prometryn	7	-	7	7	7	-	7	7	-	1	1	**8**	6	6	-	-	7	7	7	-	-	-	-	-	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**8**	**9**	6	2	5	**9**	**9**	**8**	**8**	**8**	4	5	7	F
Suprend	**8**	-	**8**	**8**	7	0	7	7	-	1	1	**9**	**9**	**9**	-	7	7	**8**	**8**	**8**	**9**	7	7	7	G
Postemergence over-the-top																									
Assure II	**8**	**9**	**9**	**8**	**8**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Dual Magnum[8]	**8**	0	**8**	**8**	**8**	0	**8**	-	7	5	7	0	2	0	-	6	**8**	**9**	2	-	2	-	0	0	G
Clethodim	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	**9**	0	0	0	0	0	0	E
Envoke[7]	2	0	2	2	2	5	7	-	**9**	7	**8**	**9**	**9**	**9**	-	-	7	**8**	2	-	**9**	-	-	**9**	F
Fusilade	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Glyphosate/Roundup Ready	**8**	5	**9**	**9**	**8**	7	**9**	**8**	**9**	7	6	6	**8**	6	3	-	**9**	**9**	**8**	6	7	**9**	**8**	7	G
Liberty 280/LibertyLink	**8**	-	**8**	**8**	5	2	**8**	-	-	4	4	**9**	**8**	**9**	-	-	**8**	**8**	7	-	**8**	**8**	**9**	7	E
Poast Plus	**9**	**8**	**9**	**9**	**9**	**8**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Sequence	**9**	6	**9**	**9**	**8**	**8**	**9**	**9**	**10**	**8**	7	**8**	**8**	6	4	**9**	**9**	**9**	7	**9**	**8**	7	**9**	7	G
Staple LX[7]	0	0	0	0	0	3	6	0	-	5	5	**9**	7	**9**	-	7	6	7	7	6	5	**9**	**9**	**9**	G
Warrant[8]	**8**	0	**8**	**8**	**8**	0	**8**	-	7	5	7	0	2	0	0	6	**8**	**8**	2	-	2	-	0	2	-
Layby – preemergence activity																									
Command	**9**	-	**9**	**9**	**9**	3	**9**	**8**	-	-	-	5	6	4	-	**8**	2	2	**9**	**9**	0	**8**	**9**	**10**	F
Diuron	5	0	5	6	5	2	5	5	4	0	0	7	4	4	1	4	**9**	**9**	4	5	**8**	3	3	3	G
+ MSMA	**8**	0	**9**	**9**	**8**	5	**9**	**8**	**8**	6	6	**8**	**9**	5	2	4	**9**	**9**	7	7	**8**	4	4	4	F
Layby Pro	6	0	6	6	6	1	6	6	0	0	0	7	5	5	0	5	7	**8**	6	7	**8**	5	4	5	G
Lorox/Linex	6	0	6	6	6	1	5	6	0	0	0	6	4	4	0	6	7	7	6	**8**	4	6	2	5	G
Valor	**8**	0	4	4	4	2	4	4	4	4	4	**8**	**9**	-	-	**8**	**8**	**8**	**10**	**8**	**9**	**8**	**8**	**8**	F

[1]Rating scale: 0-3, none to slight; 4-6, fair; 7-8, good; 9-10, excellent; Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions. Crop tolerance rating scale: E - excellent; G - good; F - fair.
[2]See Glossary for trade names.
[3]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.
[4]Johnsongrass resistance to Group 1 (Assure II, clethodim, Fusilade, Poast Plus), Group 3 (pendimethalin, trifluralin), and Group 9 (glyphosate) herbicides has been identified in Mississippi.
[5]Palmer amaranth, spiny amaranth, and tall waterhemp resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi. Palmer amaranth resistance to Group 2 (Envoke, Staple) herbicides is also common.
[6]Overlay (PPI + PRE) treatment will control a broader spectrum of weeds, but effectiveness on any given species will be no better than the highest rating for the best herbicide in the specific combination selected.
[7]Resistance to ALS or Group 2 (Envoke, Staple) herbicides has been documented in several weed species in Mississippi. Control of weeds with ALS resistance will be reduced with Envoke and Staple LX. Please see Herbicide-Resistant Weeds section for a list of herbicide-resistant weeds.
[8]Dual Magnum and Warrant will not control emerged weed species. Control ratings given are for residual control of species listed.

ROTATIONAL CROP RESTRICTIONS

Many herbicides used in cotton have planting restriction intervals for crops other than cotton. If a rotational crop is being considered for the year following cotton, the following table could assist in choosing the proper cotton herbicide for the current year. If a rotational crop is planted within the interval stated, or before the interval has expired, unacceptable injury to the rotational crop can occur.

Cotton herbicides	Rotation interval[1]						
	Corn	*Cotton*	*Grain sorghum*	*Rice*	*Soybeans*	*Wheat*	*Other grains*
Aim	none	none	none	none	none	none	none
Assure II	120 d	none	120 d	120 d	none	120 d	120 d
Clarity[2]	none	21 d	15 d	15 d	15 d	15 d	15 d
Clethodim	30 d	none	30 d	30 d	none	30 d	30 d
Cobra	none	none	none	none	none	none	none
Command	9 m	none[3]	9 m	9 m	none	12 m[4]	12 m[4]
Diuron							
band PRE or POE	4 m	none	4 m	4 m	4 m	4 m	4 m
band PRE + POE	spring	spring	spring	1 y	spring	1 y	1 y
broadcast PRE	spring	spring	spring	1 y	spring	1 y	1 y
broadcast PRE + band POE	spring	spring	spring	1 y	spring	1 y	1 y
broadcast POE	spring	spring	spring	1 y	1 y	1 y	1 y
Dual Magnum	none	none	none	spring	none	4.5 m	4.5 m
Envoke	7 m	7 m	7 m	7 m	7 m	3 m	18 m
Firstshot	14 d	14 d	7 d	none	7 d	none	none[5]
Fluometuron	8 m	none	9 m	9 m	9 m	3 m	12 m
Fusilade DX	60 d	none	60 d	60 d	none	60 d	60 d
Glyphosate	none	none	none	none	none	none	none
Goal 2XL	10 m	60 d	10 m	10 m	7 d	10 m	10 m
Layby Pro[6]	4 m	4 m	8 m	1 y	8 m	1 y	1 y
Liberty 280	none	none	180 d	none	none	70 d	70 d
Linex	none	4 m	none	1 y	none	4 m	1 y[7]
MSMA[5,7,8]	none	none	none	none	none	none	none
Paraquat	none	none	none	none	none	none	none
Pendimethalin	none	none	10 m	none	none	4 m	ns[9]
Poast Plus	none	none	none	none	none	none	none
Prefix	10 m	30 d	10 m	10 m	none	4.5 m	4.5 m
Prometryn	ns	none	ns	ns	ns	ns[10]	ns[10]
Reflex	10 m	none[11]	10 m	10 m	none	4 m	4 m
Sequence	none	none	none	spring	none	4.5 m	4.5 m
Sharpen[12]	none	42 d	none	15 d	14 d[12]	none	none
Solicam DF	24 m	30 d	24 m	24 m	45 d	24 m	24 m
Staple LX	10 m[13]	none	2 y	9 m	10 m	4 m	10 m[14]
Suprend	7 m	7 m	7 m	7 m	7 m	3 m	18 m
Trifluralin	12 m	none	12 m	12 m	none	12 m	12 m
Valor	30 d[15]	30 d[15]	30 d[15]	30 d[15]	none	30 d[15]	3–8 m
Warrant	ns	ns	ns	ns	none	4 m	ns

[1]d, m, y, spring, fall, and ns indicate days after application, months after application, years after application, spring following application, fall following application, and next season, respectively. PRE and POE indicate preemergence and postemergence applications, respectively.

[2]Rotational restrictions are for the use rate of 8 ounces per acre. At least 1 inch of rainfall or overheard irrigation required before waiting interval begins.

[3]Do not plant cotton unless disulfoton or phorate organophosphate insecticide is applied in-furrow with the seed at a minimum of 0.75 pounds active ingredient per acre.

[4]Wheat may be planted for a cover crop at any time but cannot be harvested for food or feed or grazed if planted less than 9 months after treatment.

[5]Barley, triticale, and oats can be replanted immediately. Other grains require 45 days before planting.

[6]Rotational restrictions for Layby Pro are based on application rates of 0.61 to 1 pound active ingredient per acre of diuron.

[7]Barley, oats, and rye may be replanted after 4 months.

[8]MSMA can cause straighthead in rice. Use caution when rice is grown following cotton.

[9]Do not plant wheat or barley until next season if rhizome johnsongrass or red rice control or itchgrass suppression rates are applied.

[10]Wheat or small-grain crops may be planted for a cover crop the fall following prometryn application, but may not be harvested for feed or food.

[11]A minimum of 0.5 inch of rainfall or overhead irrigation must occur before planting cotton.

[12]Rotational restrictions for soybeans following an application of Sharpen vary with rate and soil texture. Consult Sharpen label for more information.

[13]Corn may be planted 10 months after Staple LX application was made in cotton providing that the total amount of Staple LX from all applications does not exceed 3.8 fluid ounces per acre. No additional soil mixing is required beyond that normally performed for a production system.

[14]In addition to the 10-month interval, a successful field bioassy must be conducted. This requires a test strip of the rotational crop be grown to maturity.

[15]This applies to applications of 2 ounces per acre or less; additionally, 1 inch of rainfall or irrigation must occur between application and planting.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Postharvest/Fallowbed/Preplant Foliar				
Postharvest/fallowbed or preplant foliar herbicide applications are designed to provide residual control of winter annuals or burndown of existing vegetation. **Applications can be made during or after fall tillage, up to various time intervals prior to planting, depending on which herbicide is used.** Fall application of residual herbicides can reduce the need for spring tillage or spring burndown herbicides. However, exceeding maximum use rates in any 1 year is possible with certain herbicides. Also, fall application of most herbicides eliminates the possibility of fall cover crops becoming properly established. See pages 32 and 33 for expected levels of control for various weeds.				
dicamba at 0.188 to 0.25 lb/A	Clarity 4 SL — 6 to 8 oz/A	21 days before planting.	Cutleaf eveningprimrose, horseweed, buttercup species, clovers, Pennsylvania smartweed, and other winter annual weeds.	Consult the label to determine rates for weeds and growth stages. Include NIS at 0.25% v/v. If applied in the spring following a fall application the total amount applied cannot exceed 2 pounds of active ingredient per acre. The field must receive at least 1 inch of rainfall or overhead irrigation, and 21 days must pass before planting cotton after an application of Clarity. Consult the label for added restrictions following a fall application.
flumioxazin at 0.064 lb/A	Valor 51 WDG — 2 oz/A	14 to 30 days depending on application rate and tillage system.	Provides some postemergence activity on emerged weeds. Provides excellent residual control of most broadleaf weeds and suppression of annual grass weeds.	A spray-grade nitrogen (2 to 2.5 pounds per acre of AMS or 1 to 2 quarts per acre of 28 or 32% UAN) source can be added to spray mixture along with COC, methylated seed oil, or nonionic surfactant. Nitrogen addition should not replace spray adjuvant. When applying with a glyphosate formulation preformulated with a spray adjuvant, an additional spray adjuvant is not required.
fomesafen at 0.25 to 0.375 lb/A	2 lb/gal formulation — 1 to 1.5 pt/A	Before planting and after 0.5 inch of rainfall.	Control or suppression of broadleaf, grass, and sedge weeds. Good to excellent control of morningglory, prickly sida, pigweed, and yellow nutsedge.	Use a minimum of 10 gallons per acre spray volume. Rainfall within 7 days of application is necessary for activation. Some cotton injury can occur if rain falls during or soon after cotton emergence. Do not apply more than 1.5 pints per acre during the growing season. At least 0.5 inch of rainfall must occur before planting on medium- or fine-textured soils.
glyphosate at 0.37 to 0.75 lb ae/A	See glyphosate table on pages 5-6 for rates.	After weed emergence up to 3 to 7 days before planting.	Consult label for complete list of weeds controlled.	**Refer to glyphosate formulation table on page 5 for surfactant/adjuvant recommendation for specific glyphosate formulation.** Use the higher rate for larger weeds or heavy infestations. Use of flood-jet nozzles is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for rhizome johnsongrass). Cultivation before johnsongrass emergence will result in better control after glyphosate application. **Avoid drift to nearby crops or areas not intended to be treated. Do not** use with galvanized (zinc-coated) spray equipment.
norflurazon at 1 to 2 lb/A	Solicam 80 DF — 1.25 to 2.5 lb/A	Surface applied in fall after final disking or bed formation.	Annual bluegrass, chickweed, bittercress. Poor control of henbit and Carolina geranium.	Do not exceed broadcast rates of 1.25 pounds per acre for light soils, 1.9 pounds per acre on medium soils, or 2.5 pounds per acre on heavy soils in any 1 year.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
paraquat at 0.625 to 1 lb/A	2 lb/gal formulation — 2.5 to 4 pt/A; 3 lb/gal formulation — 1.67 to 2.67 pt/A	For burndown of existing vegetation before planting, but before weeds are 6 inches tall.	Top kill of most annual and perennial weeds and grasses. Perennials will regrow.	Add 1 quart of surfactant per 100 gallons of water or 1% v/v COC. Minimum application volume of 10 gallons per acre by ground and 5 gallons per acre by air. Paraquat is nonselective, so avoid spray drift onto desirable vegetation. Use the low rate on weeds under 2 inches tall.
pendimethalin at 0.75 to 1 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.5 to 2 to 3 pt/A or 3.3 EC formulation — 1.8 to 2.4 to 3.6 pt/A	After Oct. 18 up to 15 days prior to planting.	Most winter annuals and other small-seeded annuals.	Incorporate within 7 days of application if rainfall does not occur. **Do not** apply to wet soils or soils subject to prolonged flooding.
prometryn at 0.75 to 1 lb/A	4 lb/gal formulation — 1.5 to 2 pt/A	Nov. 1 up to 14 days prior to planting.	Residual control of most winter annuals and postemergence control of small (less than 2 inches) existing vegetation.	Add COC at 1 pint per acre. Use the high rate for early applications and the low rate for applications nearer to planting. Use COC if vegetation is present at application. If weeds are larger than 2 inches, addition of paraquat or glyphosate may improve control. **Do not** make multiple applications to exceed seasonal maximum rate for cotton.
oxyfluorfen at 0.25 to 0.5 lb/A	Goal 2XL — 1 to 2 pt/A in a minimum of 20 gal water by ground	Early fall up to 7 days prior to planting.	Residual control of most winter annuals, especially henbit. Postemergence control of henbit, common groundsel, and shepherdspurse up to 4-leaf stage with the addition of suitable surfactant. Fair control of chickweed.	Use the lower rate for short residual (late winter, early spring) application. Use the higher rate for long residual (fall, early winter) applications. **Soil must be tilled to depth of 2 inches** before planting unless treatment is 30 days or more prior to planting and unless at least three rainfalls of 0.25 inch or more have fallen since the application. For best preemergence activity, rainfall or irrigation should occur within 3 to 4 weeks after application, and soil should be left undisturbed during the period of desired weed control.
thifensulfuron + tribenuron at 0.25 to 0.4 oz/A	FirstShot 50 SG — 0.5 to 0.8 oz/A	After weed emergence but 14 days prior to planting.	Postemergence control of broadleaf winter weeds such as curlydock, chickweed, henbit, and buttercup.	Add NIS at 1 quart per 100 gallons of water or COC at 1% v/v. Apply to young, actively growing weeds. Allow 1 to 3 weeks after application for full control. May be mixed with other preplant herbicides to broaden weed spectrum.
trifloxysulfuron at 0.075 oz/A	Envoke 75 DF — 0.1 oz/A	Minimum of 90 days before planting.	Excellent control of many broadleaf weed species, including henbit and horseweed.	Add NIS at 1 quart per 100 gallons of water. If weeds are emerged at application, addition of glyphosate or paraquat may improve control. Do not exceed a total of 0.4 ounce per acre of Envoke from all applications in one season.
trifluralin at 1 to 1.25 lb/A	4 lb/gal formulation — 2 to 2.5 pt/A	Apply and incorporate any time between Oct. 15 and Dec. 31. May be left flat or bedded.	Annual bluegrass, chickweed, henbit, and other winter annuals.	**Do not** apply to wet soils or soils subject to prolonged flooding.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant Incorporated				
norflurazon at 1 to 2 lb/A	Solicam 80 DF — 1.25 to 2.5 lb/A depending on soil texture.	Within 30 days of planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida and good control of spurred anoda.	Incorporate no deeper than 2 to 3 inches after beds have been reduced for planting. Do not use where johnsongrass or morningglory is a major problem. Incorporation offers potential advantages over surface application: (1) better control under early- season dry conditions; (2) better suppression of deep germinating weeds such as cocklebur and morningglory; and (3) better suppression of perennials such as nutsedge and bermudagrass. The application also may be split with half the rate preplant incorporated and the other half applied on the surface after planting.
pendimethalin at 0.48 to 1.9 lb/A	Prowl H_2O 3.8 CS — 1 to 4 pt/A or 3.3 EC formulation — 1.2 to 4.6 pt/A	Preplant incorporated — up to 60 days before planting; Preplant surface — up to 15 days before planting.	Residual control of most annual grasses and small-seeded broadleaf weeds, such as purslane and pigweed.	Use 1 to 2 pints per acre on coarse-textured soils (conventional or reduced tillage systems) and 2 pints per acre on coarse-textured soils under no-till systems. Use 2 pints per acre on medium-textured soils for conventional or reduced tillage and 3 pints per acre in no-till. Use 3 pints per acre on fine-textured soils in conventional or reduced tillage and 4 pints per acre in no-till. Incorporate 1 to 2 inches deep immediately after application for best results. When making band applications, avoid removal of treated soil from the seedbed during incorporation and planting.
trifluralin at 0.5 to 0.75 to 1 lb/A	4 lb/gal formulation — 1 to 1.5 to 2 pt or 5 lb/gal formulation— 0.8 to 1.2 to 1.6 pt in 5 gal water by air or 10 gal water by ground	Any time after Jan. 1 to immediately before planting.	Most annual grasses and some small-seeded broadleaf weeds, such as pigweed and purslane.	Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours. When making band applications, avoid removal of treated soil from the seed-bed during incorporation and planting.
Preemergence				
Preemergence herbicide applications should be made after planting but before weed or crop emergence. Avoid planting cotton seed less than 0.5 inch deep to avoid excessive injury during periods of heavy rainfall. Substituted-urea herbicides such as fluometuron or diuron may interact when used in combination with organophosphate insecticides at planting, resulting in cotton injury. **Use of an organophosphate insecticide, in-furrow, is mandatory when applying clomazone preemergence.**				
clomazone at 0.5 to 1 lb/A	Command 3 ME — 1.33 to 2.67 pt/A	At planting**.**	Excellent control of annual grasses and many small-seeded broadleaf weeds, except pigweed. Use low rate when only velvetleaf control is desired. Addition of fluometuron at recommended rates **improves morningglory and cocklebur control.**	**Use an organophosphate insecticide, in-furrow, to prevent cotton injury!** Failure to do so will result in severe cotton injury and stand loss. These insecticides may, however, cause injury when used with fluometuron or diuron. Clomazone has a high potential for off-site movement by drift and/or volatility. **Do not apply within 1,200 feet of residential areas, unsafened cotton, horticultural crops, and other sensitive species. Do not apply** during periods of high winds in excess of 10 mph and/or expected heavy rainfall. **Apply to dry soil when potential for drift is low. Use low pressure and drift control agents where possible.**
diuron at 0.5 to 1.0 to 1.6 lb/A	4 lb/gal liquid formulation — 1 to 2 to 3.2 pt in 10 to 20 gal water	At planting.	Most annual grasses and small-seeded broadleaf weeds. Fair to good control of prickly sida and morningglory.	If stand failure occurs, cotton may be replanted through the treated band with minimum disturbance of the treated soil. In a single season, do not exceed 0.8 pound of active ingredient on loamy sand, 1.2 pounds on sandy loam, 1.6 pounds on clay loam, or 2.2 pounds on clay. Injury may occur if used with soil-applied organophosphate pesticides. Rebed only after thorough tillage.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
fluometuron at 0.75 to 1.5 to 2 lb/A	4 lb/gal formulation — 0.75 to 1.5 to 2 qt	At planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida and morningglory.	If stand failure occurs, cotton may be replanted through the treated band with minimum disturbance of the treated soil. Injury may occur if used with soil-applied organophosphate pesticides. Rebed only after thorough tillage.
norflurazon at 1 to 1.5 to 2 lb/A	Solicam 80 DF — 1.25 to1.9 to 2.5 lb in 10 to 20 gal water	At planting.	Most annual grasses and small-seeded broadleaf weeds. Good to excellent control of prickly sida, and good control of spurred anoda. Inadequate control of morningglory.	If stand failure occurs, cotton, soybeans, or peanuts may be replanted through the treated band with minimum disturbance of the treated soil, or the area may be reworked. Rebed only after thorough tillage. Norflurazon also may be applied preplant incorporated or as a split application with half preplant incorporated and the other half preemergence. See the preplant incorporated section.
pendimethalin at 0.5 to 0.75 to 1 lb/A	Prowl H_2O 3.8 CS — 1 to 1.5 to 2 pt/A or 3.3 EC formulation — 1.2 to 1.8 to 2.4 pt/A	Within 2 days after planting	Most grasses from seed and some small-seeded broadleaf weeds, such as pigweed and purslane.	Rainfall or overhead irrigation is needed within 7 days for activity. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration, or drought can weaken seedlings and increase the possibilty of crop damage.
pyrithiobac at 0.0325 to 0.0525 lb/A	Staple LX — 1.3 to 2.1 oz/A	At planting.	Spurge and prickly sida.	Do not use on coarse soils such as sands or loamy sands.

Postemergence — directed

Many of the suggested postemergence treatments include MSMA with another herbicide for broader spectrum weed control. Costs can be reduced by omitting the MSMA where nutsedge, cocklebur, or grasses are not a problem. When omitting MSMA in the spray mixture, be sure to add surfactant.

Use of the arsenical herbicides (MSMA) is limited to two applications whether used alone or in combination with other herbicides. Timely directed applications are preferable to over-the-top applications because of better weed control and less cotton injury. **DO NOT APPLY MSMA AFTER FIRST BLOOM.** A number of instances of MSMA resistance in common cocklebur have been documented throughout Mississippi. See page 9 for more information.

3-inch cotton or larger

MSMA at 2 lb/A	MSMA — 2.7 pt of a 6 lb/gal formulation in 20 gal water	Apply once or twice after the smallest cotton reaches a height of 3 inches.	Most annual grasses, susceptible cocklebur, and some other annual broadleaf weeds. Nutsedge and small johnsongrass plants will be topkilled. Combinations with other herbicides more effective on goosegrass than when used alone.	**Do not apply after first bloom.** Addition of fluometuron or prometryn will broaden spectrum of weeds controlled. This treatment is more effective during hot, dry periods than in cool, wet periods. Add 1 quart of surfactant per 100 gallons of spray mix unless the formulation contains surfactant.
fluometuron at 0.8 lb/A (or MSMA, see above)	4 lb/gal formulation — 0.8 qt in 20 gal water	Apply once or twice when cotton is 3 to 6 inches tall.	Annual grasses and most seedling broadleaf weeds.	Add 1 quart of surfactant for each 100 gallons of spray mix. This treatment is relatively safe on young cotton and also provides residual preemergence weed control.
prometryn at 0.5 lb/A (or plus MSMA)	4 lb/gal formulation — 1 pt in 20 gal water	Apply once or twice after cotton is 3 inches tall.	Most seedling broadleaf weeds including prickly sida if sprayed before 2 inches tall. Addition of MSMA improves grass control.	Add 1 quart of surfactant for each 100 gallons of spray mix. **Do not** apply at the 3-inch stage if cotton is stressed. Provides some residual preemergence control in addition to killing emerged weeds.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
6-inch cotton or larger (in addition to herbicides listed for smaller cotton)				
carfentrazone at 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A	Cotton should be at least 6 inches tall with 5 to 6 nodes.	Morningglories, pigweed, and velvetleaf.	Use a COC at 1% v/v (1 gallon per 100 gallons of spray solution). Applications to shorter than 6 inches must be made with cotton hooded or shielded sprayer equipment to completely avoid contact with cotton plants. Directed spray equipment should position nozzles a minimum of 3 to 4 inches above the soil, with nozzles directed underneath the crop canopy. **Do not allow spray solution to contact cotton foliage or green stem tissue. Coverage is essential for good control.** For control of additional broadleaf weeds and grasses, Aim herbicide may be tank mixed with other herbicides registered for use in cotton. Aim may be tank mixed with glyphosate, Staple LX, Caparol, Cotoran (or other products containing Fluometuron), Karmex, MSMA, or other herbicides registered for cotton postdirected and/or layby applications. Do not apply more than 3.2 ounces of 2EC total per season by postdirected and layby applications.
diuron at 0.2 to 0.5 lb/A (or plus MSMA, see page 38)	80 DF formulation — 0.25 to 0.62 lb or 4 L formulation 0.4 to 1 pt in 20 gal water	Apply once or twice after cotton is 6 inches tall.	Most seedling broadleaf weeds. Addition of MSMA improves grass control.	Add 1 quart of surfactant for each 100 gallons of spray mix. Apply as directed spray. Diuron plus MSMA provides better weed control under a wide range of growing conditions than either herbicide alone. Use the higher rate of diuron as cotton and weeds become larger. The higher rate provides some residual preemergence control in addition to killing emerged weeds.
fomesafen at 0.25 to 0.375 lb ai/A	2 lb/gal formulation — 1 to 1.5 pt/A in a minimum of 10 gal water	Cotton must be at least 6 inches tall.	Control or suppression of broadleaf, grass, and sedge weeds. Good to excellent control of morningglory, pigweed, common ragweed, hemp sesbania, and Pennsylvania smartweed.	Add 1% v/v COC or 1 quart of surfactant for each 100 gallons of spray mix. Apply as a directed spray to cotton at least 6 inches tall. Use shielded or hooded applications on 6- to 12-inch cotton. Contact with cotton foliage can cause significant injury. Adjust nozzles to provide complete coverage of weeds. Do not apply with liquid nitrogen. Do not apply within 70 days of cotton harvest. Do not apply more than 1.5 pints per acre per season.
lactofen at 0.2 lb/A (or plus MSMA, see page 38)	Cobra 2 EC — 0.8 pt in 20 gal water	Apply once or twice after cotton is 6 inches tall.	Most small broadleaf weeds. Addition of MSMA improves grass control.	Add 0.5 to 1 pint per acre COC for cotton 6 to 8 inches tall or 1 to 2 pints per acre for cotton taller than 12 inches. For best results, spray weeds before 3-inch height. Use as a well directed basal spray to minimize cotton injury. Height differential between cotton and weeds is important since good spray coverage on the weeds is necessary for control.
linuron 0.5 to 0.75 lb/A	Linex 4L — 1 to 1.5 pt/A	When cotton is at least 8 inches tall and weeds are not over 2 inches tall.	Annual grass and broadleaf species.	Linex 4L or Lorox 50DF should be applied as a directed spray with nozzles adjusted to minimize contact to cotton. One pint of surfactant may be added for each 25 gallons of spray mixture if emerged weeds are present. If a second application is needed, use the same rate and apply 1 week or more after first treatment. Do not use this treatment on Pima varieties. Do not feed forage or gin trash from treated areas to livestock. Do not graze treated fields.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
linuron + diuron 0.25 + 0.25 to 0.375 + 0.375 lb/A	Layby Pro 4L — 1 to 1.5 pt/A	When cotton is 6 to 8 inches tall.	Annual grass and broadleaf weeds.	Apply as a directed spray. Use the lower rate on 6-inch cotton and the higher rate on 8-inch cotton or taller. For control of emerged weeds, add a nonionic surfactant at 0.5% v/v or a COC at 1% v/v. Do not use a COC on cotton that is less than 12 inches in height.
oxyfluorfen at 0.25 or 0.5 lb/A (or plus MSMA, see page 38)	Goal 2XL — 1 or 2 pt/A in 20 gal water	After cotton is 6 inches tall and before weeds have more than 4 true leaves.	Most seedling broadleaf weeds including prickly sida, morningglory, and hemp sesbania. Addition of MSMA improves grass control.	Add 1 quart of surfactant for each 100 gallons of spray mix. Good spray coverage on the weeds is essential for control. Oxyfluorfen is most effective under optimum growing conditions. Use the higher rate on larger weeds or under drought conditions.
prometryn + trifloxysulfuron 0.8 to 1.2 lb/A + 0.007 to 0.0105 oz/A	Suprend 80 DF — 1 to 1.5 lb/A	When cotton is at least 6 inches tall.	Controls morningglories, velvetleaf, smooth pigweed, tall waterhemp, sicklepod, cocklebur, and hemp sesbania while providing suppression of various other broadleaf and grass species.	**A nonionic surfactant** at 0.25% v/v or 1% v/v of COC should be used with Suprend. For best results, apply to weeds less than 6 inches in height. Do not apply within 60 days of harvest. Use post-directed application methods to provide coverage of weed foliage while adjusting nozzles to minimize contact of cotton foliage with spray or drift. Do not exceed a total of 2.7 pounds per acre of Suprend per season. Do not exceed a total of 0.0188 pound of active ingredient of trifloxysulfuron per acre per season in all applications of Suprend or Envoke. Application of Suprend to soils with pH higher than 7.5 may increase the potential for rotational crop injury. **Unacceptable cotton injury may occur** if you tank-mix Suprend with malathion, profenofos (Curacron) or emamectin-benzoate-containing insecticides (Denim), acephate, Bidrin, Capture, or Karate.
Postemergence — Over-the-top				
acetochlor at 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A, depending on soil texture	Must be applied postemergence to crop but preemergence to weeds	Grasses and small-seeded broadleaves	Applications must be made before first bloom.
clethodim at 0.0625 to 0.125 lb/A	Select Max 1 EC — 12 to 16 oz/A when applied alone or 9 to 16 oz/A when applied with glyphosate (see table below) in 10 to 30 gal/A by ground or 3 gal/A by air. Add 1 qt/A crop oil concentrate.	Apply to actively growing grasses up to 60 days before harvest. See table below.	Annual and perennial grasses.	Apply over the top or semi-directed to cover grasses. Adjust spray volume and pressure to ensure thorough coverage of grass. **Do not apply** more than 32 ounces per acre per season. **Do not apply** within 1 hour of anticipated rainfall. **Do not apply** to stressed grasses. **Do not cultivate** within 7 days of application.
MSMA at 0.75 to 1 lb/A	6 lb/gal formulation — 1 to 1.3 pt/A in 10 to 20 gal/A water	Apply when cotton is 3 to 6 inches tall. Do not apply after first square or when cotton is more than 6 inches tall.	Excellent control of susceptible cocklebur and small annual grasses. Poor control of hemp sesbania and prickly sida.	Add 1 quart of NIS to each 100 gallons of spray mix unless formulation contains surfactant. **Use as a salvage treatment only.** Possible burning and reddish color of foliage may appear. May delay cotton maturity. **Do not** tank mix with other herbicides. Apply only to healthy cotton under favorable growing conditions.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
fluometuron at 0.5 to 1 lb/A	4 lb/gal formulation — 1 to 2 pt/A	Apply after cotton reaches 3 inches and weeds are as small as possible.	A wide spectrum of annual weed seedlings controlled or suppressed to allow more effective directed sprays later.	Add 1 quart of surfactant for each 100 gallons of spray mix. **Use as a salvage treatment only. Crop injury may occur.** Apply only to healthy cotton under favorable growing conditions. Use the higher rate on vigorously growing cotton and bigger weeds.
fluazifop at 0.094 to 0.188 lb/A	Fusilade DX 2 — 0.375 to 0.75 pt in a minimum of 5 gal water by air or ground equipment.	Apply to actively growing grasses. See table below.	Most annual grasses, rhizome johnsongrass, and bermudagrass. See table below.	Add either a COC at 1% or a surfactant at 0.25%. Apply over the top of cotton or as a semi-directed spray to the grass at rates given in the table below. Adjust spray volume and pressure to ensure thorough coverage of grass foliage. For annual grasses, retreat if needed for late emerging grasses. If regrowth of johnsongrass or bermudagrass occurs following the first application, a second application can be made as indicated in the table. **Do not** apply more than 48 ounces per acre per season. **Do not** apply after boll set or within 90 days of harvest.

Kind of grass	Size (in)	Rate lb ai/A	Rate oz/A
Seedling johnsongrass	2-8 tall	0.094	6
Goosegrass	2-4 tall	0.125	8
Barnyard and crabgrass	1-2 tall	0.188	12
Broadleaf signalgrass	2-4 tall	0.188	12
Rhizome johnsongrass	8-18 tall	0.188	12
2nd application	6-12 tall	0.125	8
Bermudagrass	4-8 runners	0.188	12
2nd application	4-8 runners	0.125	8

metolachlor at 0.75 to 1.33 lb/A or s-metolachlor at 0.48 to 1.27 lb/A	8 lb/gal formulation or Dual Magnum 7.62 EC — 0.5 to 1.33 pt/A	Apply when cotton is 3 to 12 inches tall.	Preemergence control of annual grasses and small-seeded broadleaf weeds.	This treatment will not provide postemergence control of emerged species. Do not apply within 100 days of harvest.
pendimethalin at 0.26 to 0.53 lb/A	Prowl H_2O 3.8 CS — 1 to 2 pt/A	Before weed emergence.	Preemergence control of annual grasses and small-seeded broadleaf weeds.	This treatment will not provide postemergence control of emerged species. When tank-mixed with Roundup PowerMax or Roundup WeatherMax, AMS is required.
pyrithiobac at 0.065 to 0.095 lb/A	Staple LX — 2.6 to 3.8 oz/A	From 1-true-leaf cotton up to 60 days before harvest; after weed emergence up to 1- to 4-inch weeds, except sicklepod and prickly sida.	Excellent postemergence control of most broadleaf weeds. Poor grass control.	Add nonionic surfactant at 1 quart per 100 gallons of spray mix. **Optimum control depends upon** proper timing, thorough coverage of weed foliage, and a well-designed preemergence program. **Do not tank mix** with insecticides containing malathion. Staple antagonizes grass control with postemergence grass herbicides. Adequate control can be achieved by treating grass 3 to 5 days before or 5 to 7 days after Staple application. Apply as a "sloppy" postdirected spray when applying Staple with MSMA. Do not tank mix with Dual as a postemergence treatment. Do not exceed 3.8 ounces per acre in a single application or 5.1 ounces per acre per season. Do not apply within 60 days of harvest. If the rate does not exceed 3.8 ounces per acre, corn may be planted 10 months after the last application. Apply to prickly sida up to 1 inch tall for adequate control. See label for sicklepod program.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
pyrithiobac + glyphosate 0.0325 to 0.095 lb ai/A + 0.77 lb ae/A	Staple LX — 1.3 to 3.8 oz/A plus glyphosate formulation as shown in table on page 5	May be applied over the top of Roundup Ready through the 4-true-leaf stage and over the top of Roundup Ready Flex until 60 days before harvest.	Excellent postemergence control of most broadleaf, grass, and sedge weeds.	**See the previous instructions for pyrithiobac.** For over-the-top application to Roundup-Ready Flex cotton, use only glyphosate formulations approved for Roundup Ready Flex varieties.
quizalofop at 0.0313 to 0.0625 lb/A	Assure II — 5 to 10 oz/A in a minimum of 10 gal/A by ground or 2 gal/A by air	Apply to actively growing grasses any time prior to 80 days before harvest. See table below.	Annual and perennial grasses; excellent control of johnsongrass.	Add COC at 1% v/v or NIS at 0.25% v/v. Use crop oil at 0.5% v/v for aerial application. Use only petroleum-based crop oils. Apply over the top or semi-directed to cover grasses. Adjust pressure and spray volume to ensure thorough coverage of grass. **Do not apply** using crop-origin (vegetable) oils as an adjuvant or carrier. **Do not apply** more than 18 fluid per ounces per season. **Do not apply** within 24 hours of a postemergence broadleaf herbicide. **Do not** cultivate within 7 days of application.

Kind of grass	Weed height (in)	Rate (fl oz/A)
Seedling johnsongrass	2-8	5
Volunteer corn	8-18	5
Most annual grasses	2-6	7
Barnyard grass	2-6	8
Broadleaf signalgrass	2-6	8
Crabgrass	2-6	8
Red rice	1-4	9
Rhizome johnsongrass	10-24	10
2nd application	6-10	7
Bermudgrass	3	10
2nd application	3	7

sethoxydim at 0.19 to 0.28 lb/A	Poast Plus — 1.5 to 2.25 pt/A in a minimum of 5 gal water by air or ground equipment	Apply to actively growing grasses. See table below.	Most annual grasses, seedling and rhizome johnsongrass, and bermudagrass.	Add COC at 1 quart per acre with aerial and ground applications. Apply over the top of cotton or as a semi-directed spray to the grass. Adjust spray volume and pressure to ensure thorough coverage of grass foliage. Apply at rates and growth stages given in the table below. If more annual grasses emerge after the first application, then additional applications can be made. A second application can be made to control regrowth of johnsongrass and bermudagrass. **Do not** apply within 40 days of harvest.

Kind of grass	Size (in)	Rate ai/A	Rate pt/A
Crabgrass and goosegrass	up to 6 tall	0.19	1.5
Other annual grasses including seedling johnsongrass	up to 8 tall	0.19	1.5
Rhizome johnsongrass*	15-20 tall	0.19	1.5
2nd application	6-10 tall	0.19	1.5
Bermudagrass	plant diameter 6 or less	0.28	2.25
2nd application	regrowth 1-4 long	0.19	1.5

*If spray volume is more than 10 gallons per acre, increase the rate on johnsongrass at first application to 2.25 pt/A.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
trifloxysulfuron at 0.08 to 0.11 oz/A	Envoke 75 DG — 0.1 to 0.15 oz/A	When cotton has reached a minimum of 5 true leaves.	Morningglories, sicklepod, pigweed, and nutsedge.	Envoke may cause temporary yellowing or stunting of cotton plants, but they usually recover quickly. **A NIS should be added to the spray solution at 0.25% v/v. Do not apply in combination with any other herbicide when applied over-the-top.** Envoke may be tank mixed with other products when applied as a post-directed spray (See label for specifics). **Do not tank mix with insecticides containing malathion, profenofos, or emamectin-benzoate or unacceptable injury may occur.** Envoke antagonizes grass control with postemerenge grass herbicides. Do not apply these products within 7 days of Envoke application.

Cultivation—use so that the soil moved by it will not interfere with subsequent use of postemergence herbicides. Cultivation will not normally detract from the control obtained from previously applied herbicides, but frequently will offer an economical means of extending or completing control established by herbicides. Deep cultivation (more than 2 inches) usually is not necessary and may damage the crop.

Liberty Link Varieties Only

glufosinate at 0.4 to 0.78 lb/A	Liberty 280 (2.34 lb/gal) — 22 to 29 oz/A. Single application rate can be as high as 43 oz/A.	Apply to tolerant cotton from emergence to early-bloom. Weeds should not exceed 3 to 6 inches.	Excellent control of cocklebur, hemp sesbania, and morningglory species. Good control of sicklepod and some pigweed species.	**For use only in Liberty Link cotton**. Ground application should be applied in a minimum of 15 gallons of spray mix. Do not apply more than 72 to 87 fluid ounces per acre in a single growing season. The maximum total application rate is dependant upon whether Ignite was applied at burndown, as well as the application rate at that time. Do not apply within 70 days of harvest. Apply in at least 10 gallons of water per acre. Avoid use of air induction spray tips, as reduced control is likely.

Roundup-Ready Flex Varieties

glyphosate at 0.375 to 1.12 lb ae/A	See glyphosate table on pages 5-6 for rates.	After weed emergence. May be applied to **Roundup Ready Flex Cotton** until 7 days prior to harvest.	Postemergence control of most annual broadleaf and grass weeds, including johnsongrass. A well-designed residual herbicide program is recommended for optimum control and resistance management.	**For use only on Roundup-Ready Flex Cotton.** Do not apply at rates above 32 fluid ounces per acre. **In-crop application rates above 22 fluid ounces per acre** made alone or with the addition of other crop chemical products containing surfactant may cause a crop response including leaf speckling or leaf necrosis. From cracking until 60% open bolls, up to 4 quarts may be applied. The maximum allowed from 60% open bolls until 7 days prior to harvest is 44 fluid ounces per acre. The maximum allowed per year, including preplant burndown applications, is not to exceed 5.3 quarts per acre.
s-metolachlor + glyphosate acid at 0.94 to 1.33 lb/A + 0.70 to 0.98 lb/A	Sequence — 2.5 to 3.5 pt/A	Make postemergence applications from 3-inch to 12-inch cotton.	Postemergence control of most annual broadleaf and grass weeds. Preemergence control of annual grasses and small-seeded broadleaf weeds.	**This treatment is for use only on Roundup-Ready Flex Cotton**. Do not exceed 2.5 pints of Sequence per acre in a single application. Do not exceed 3.5 pints per acre in a season. Do not apply within 100 days of harvest.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Spot Treatment				
clethodim	Select Max 1 EC — 12 to 16 oz/A when applied alone or 9 to 16 oz/A when applied with glyphosate.	Apply to actively growing grasses up to 60 days before harvest.	Annual and perennial grasses.	Include 1% COC when applying Select Max alone. Spray to wet foliage but not to point of runoff.
fluazifop	Fusilade DX —1% + 0.25% surfactant or 1% crop oil concentrate. See table below.	Apply to all actively growing grasses.	Johnsongrass and bermudagrass.	Apply to 8- to 18-inch johnsongrass or bermudagrass up to 3 inches tall before runners are 8 inches long. Spray grass to wet all foliage but not to the point of runoff. **Do not** apply more than 48 ounces per acre per season. **Do not** apply after boll set or within 90 days of harvest.
glyphosate spray	glyphosate — 1% solution in water for most weeds, including johnsongrass. Increase to 2% solution for harder-to-control perennials, such as bermudagrass.	Spray to wet foliage of weeds before cotton bolls open.	Johnsongrass, bermudagrass, trumpetcreeper, and most other emerged annual and perennial weeds.	Treatment is most effective on large, actively growing weeds. Conventional cotton sprayed with herbicide solution will be severely injured or killed. Avoid windy conditions and high pressure to minimize cotton injury. Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. See the label for details.
glyphosate rope wick	glyphosate — 1 gal + 2 gal water. Quantity used per acre will vary depending on density of weeds. Do not add surfactant to the herbicide solution.	Apply when johnsongrass is at least 18 inches tall and 8 inches taller than crop plants.	Johnsongrass.	Use rope wick made of polyester over acrylic. Position wick bar 2 to 4 inches above crop plants to avoid contact with herbicide-laden rope. Repeat application as needed to control johnsongrass that later grows above crop canopy. Treatments may be applied in conjunction with tillage of crop. **Crop will be injured** if the herbicide comes in contact with the foliage by dripping or rubbing. **Keep ground speed** under 5 mph, and reduce speed as weed density increases.
quizalofop	Assure II — 0.375% +1% v/v crop oil concentrate or 0.25% v/v nonionic surfactant	Apply to actively growing grasses up to 80 days before harvest.	Annual and perennial grasses.	Treat plants on a spray-to-wet basis insuring good coverage.
sethoxydim	Poast Plus — 1.5% + 1% crop oil concentrate. See table below.	See table below.	Bermudagrass and johnsongrass.	Mix as shown in table below. Spray grass to wet all foliage but not to the point of runoff. Spray actively growing foliage when johnsongrass is 15 to 20 inches tall and bermudagrass plants do not exceed 6 inches in diameter. **Do not** apply within 40 days of harvest.

Amount of

Spray mix	Surfactant (0.25%)	or	Oil Conc. (1%)	**Fusilade DX**
1 gal	0.5 oz	or	1.5 oz	0.75 oz
100 gal	1 pt	or	8 pt	8 pt

Amount of

Spray mix	Oil conc. (1%)	**Amount of Poast Plus** Herbicide conc. (1.5%)
1 gal	1.28 oz	1.9 oz
100 gal	8 pt	12 pt

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Layby				
carfentrazone at 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A 2EC	Layby applications of Aim or Aim tank mixtures at later growth stages may be made when cotton is at least 12 inches tall with sufficient bark development and height differential between bottom leaves and soil.	Morningglories, pigweed, and velvetleaf.	Use a COC at 1% v/v (1 gallon per 100 gallons of spray solution). Spray solution should be directed at the base of cotton plants for minimal contact with green stem tissue or foliage while maintaining maximum contact with broadleaf weeds that are at appropriate treatment size. **Do not allow** spray solution to contact cotton foliage or green stem tissue. **Coverage is essential** for good control. For control of additional broadleaf weeds and grasses, Aim herbicide may be tank mixed with other herbicides registered for use in cotton. Aim may be tank mixed with glyphosate, Staple LX, Caparol, Cotoran (or other products containing Fluometuron), Karmex, MSMA, or other herbicides registered for cotton postdirected and/or layby applications. Do not apply more than 3.2 ounces of 2EC total per season by postdirected and layby applications.
clomazone at 0.75 to 1 lb/A	Command 3ME — 2 to 2.67 pt/A	Command 3ME may be applied as a postemergence directed spray at layby when cotton has at least 8 nodes.	Annual grasses and several broadleaf weeds. Command provides only preemergence control of key grasses and broadleaf weeds. If weeds have already emerged, either cultivation or an appropriate tank mixture will be required to achieve the desired layby weed control.	Command may be applied alone, or as a tank-mix combination, with ground equipment such as postdirected sprayers, layby sprayers, or hooded sprayers. Adjust spray equipment to minimize spray contact with cotton leaves and to insure that spray is applied to the soil in a uniform manner. **Severe bleaching will occur** to those cotton leaves sprayed with Command. **Do not spray** Command over the top of cotton. The use of an organophosphate insecticide is not required when Command is applied as a layby treatment after cotton plants have at least eight nodes. **Do not apply Command** within 65 days of harvest. Do not apply Command 3ME herbicide as a layby treatment if the product has already been applied as a planting time application. Do not apply more than 1 pound of active ingredient per acre. Offsite movement of spray drift or vapors of **Command 3ME** can cause foliar whitening or yellowing of some plants. Do not allow livestock to graze on treated cotton forage or trash. Do not feed treated cotton forage or trash to livestock.
diuron at 0.5 to 1 to 1.2 lb/A	4 lb/gal formulation — 1 to 2 to 2.4 pt in 20 gal water	Apply when cotton is at least 12 inches tall.	Most late-emerging annual grasses and small-seeded broadleaf weeds will be controlled if rain occurs within 10 days after treatment. Also, young, actively growing weeds less than 3 inches tall will be controlled.	Add 1 quart of surfactant for each 100 gallons of spray mix. Apply broadcast spray as indicated. Omit surfactant if no emerged weeds are present attime of treatment.

Cotton, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin at 1.02 oz/A	Valor SX — 2 oz/A	When cotton is at least 16 inches tall. Apply to 2- to 4-inch emerged weeds.	Provides contact control of cocklebur and morningglories. Provides residual control of morningglories, tall waterhemp, hemp sesbania, and various annual grass species.	**Severe crop injury may result** if application is made to green or unbarked stem. Do not apply more than 2 ounces of Valor per acre per application, and do not exceed 4 ounces of Valor during a single growing season. Wait at least 30 days between sequential applications, and do not apply within 60 days of harvest. Do not allow spray to come in contact with crop foliage. Use a NIS at 0.25% v/v. **Do not use** a COC, methylated seed oils, organo-silicant surfactants, or products containing these ingredients as severe crop injury may occur. Layby application may be made once cotton is at least 16 inches tall. Valor application should be directed to the bottom of the stem in order to avoid cotton injury.
fomesafen at 0.25 to 0.375 lb/A	2 lb/gal formulation — 1 to 1.5 pt/A in a minimum of 10 gal water.	When plants have at least 4 inches of brown bark.	Control or suppression of broadleaf, grass, and sedge weeds. Good to excellent control of morningglory, pigweed, common ragweed, hemp sesbania, and Pennsylvania smartweed.	Add 1% v/v COC or 1 quart of surfactant for each 100 gallons spray mix. Apply directed to the base of cotton plants with at least 4 inches of brown bark, avoiding contact with any nonbarked portions. Adjust nozzles to provide complete coverage of weeds. Do not apply with liquid nitrogen. Do not apply within 70 days of cotton harvest. Do not apply more than 1.5 pints per acre per season.
linuron at 1 to 1.5 lb/A	Linex 4L — 2 to 3 pt/A	Apply when cotton is at least 20 inches tall and weeds are not over 2 inches tall.	Most late-emerging annual grasses and small-seeded broadleaf weeds will be controlled if rain occurs within 10 days after treatment. Also, young, actively growing weeds less than 3 inches tall will be controlled.	Apply as a directed spray with nozzles adjusted to minimize contact to cotton. Omit surfactant if no emerged weeds are present at time of treatment. Where the weed problem is light, apply a half rate after the cotton is 12 inches tall and re-treat only if necessary.
linuron + diuron at 0.8 + 0.8 to 1.2 + 1.2 lb/A	Layby Pro 4L — 1.6 to 2.4 pt/A	Apply layby to cotton at least 15 inches tall and weeds no more than 4 inches tall.	Annual grass and broadleaf weeds.	For control of emerged weeds, add a NIS at 0.5% v/v or a COC at 1% v/v.
pendimethalin at 0.5 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.1 to 3.2 pt/A or 3.3 EC formulation — 1.2 to 3.6 pt/A	After last normal cultivation (layby).	Most annual grasses and small-seeded broadleaf weeds such as pigweed and purslane.	Apply to the soil between rows as a directed spray following the last normal cultivation. Destroy existing weeds prior to application. **Avoid spray contact** to nonwoody portion of cotton stems and foliage or serious crop injury may occur. Apply at least 60 days before harvest.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Alternative weed management techniques				
Hooded sprayers — Use of nonselective herbicides applied with hooded sprayers to avoid contact with the crop may be desirable for weed control in row middles, especially in no-till or conservation tillage systems. Addition of a residual-type herbicide will extend weed control and may negate the need for a layby application made to 12-inch tall or greater cotton.				
flumioxazin at 0.064 lb/A	Valor 51 WDG — 2 oz/A	Valor may be applied with a hooded or shielded sprayer after cotton is at least 6 inches tall.	Provides some post-emergence activity on emerged weeds. Provides excellent residual control of most broadleaf weeds and suppression of annual grass weeds.	**Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage. Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation. Refer to flumioxazin under the *Preplant Foliar* subsection previously in the cotton section for information on spray adjuvant requirements. Do not apply more than 4 ounces per acre in any growing season. Do not make sequential applications within 30 days. Do not apply within 60 days of harvest.
glufosinate at 0.4 to 0.78 lb/A	Liberty 280 (2.34 lb/gal) — 22 to 43 oz/A	Ignite 280 SL may be applied from emergence through early bloom using a hooded sprayer.	Annual grasses and broadleaf weeds, especially morning-glory.	**Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage when applying to cotton varieties **not tolerant to Ignite 280SL.** Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation. Make up to three applications per season. A single application up to 43 ounces per acre can be made. Total seasonal application must not exceed 72 to 87 ounces per acre. Do not harvest cotton within 70 days of the last application of Ignite 280SL.
paraquat at 0.312 to 0.625 lb/A	Gramoxone 2 SL — 1.25 to 2.5 pt/A	Apply to 6-inch tall cotton.	Annual grasses and broadleaf weeds less than 6 inches tall.	Include 0.5% (v/v) NIS or 1% (v/v) COC **Use a hooded sprayer ONLY.** Keep the bottom edge of the hood in contact with the soil surface. **Avoid crop contact with spray solution.** Avoid use of spray tips that produce fine spray droplets. (**State Label**). **Other formulations of paraquat are NOT labeled for hooded sprayer applications.**

SOYBEANS

Canopy closure. Adapted cultivars that rapidly develop a full canopy can be an effective weed control practice. As a general rule of thumb, later-maturing and later-planted soybeans tend to develop fuller canopies. Additionally, determinate varieties (generally MG V and later) tend to canopy better than indeterminate varieties (generally MG IV and earlier) that are often used in conjunction with the Early Soybean Production System (ESPS). Soybeans planted extremely early during cool and wet growing conditions tend to be short, and canopy closure is difficult to achieve. Narrowing row spacings can aid in canopy closure and weed control, especially with early-planted indeterminate varieties. In situations where 38- to 40-inch row spacings are utilized, planting two rows on top of a bed (twin rows) rather than a single row will improve canopy closure and often improve yields.

Weed resurgence. Weed resurgence is a major problem in early-maturing soybeans. Soybeans planted using the ESPS are generally harvested in August and early September. As soybeans senesce and light reaches the soil, weeds begin to emerge and can greatly reduce harvest efficiency at harvest, often resulting in yield loss. Strategies to manage weed resurgence include (1) using preemergence herbicides or adding residual herbicides to postemergence applications, (2) using layby applications in wide-row soybeans and in wheel tracks, and (3) using harvest aids prior to harvest. Postharvest herbicide applications also may be useful in no-till fields to prevent weeds from going to seed after harvest.

No-till or reduced-till systems. It is often desirable to kill existing vegetation with herbicides and not till the soil prior to planting soybeans. The nonselective herbicides glyphosate, glufosinate, and paraquat are generally very effective for this. The PRE herbicides Canopy, Scepter, Metribuzin, Valor, Firstrate, Python, and others have POE and PRE activity and can be a useful component in "burndown" programs to expand the weed control spectrum and provide soil residual activity up to planting and sometimes beyond. Early burndown programs that include residual herbicides have proven efficacious and economical when used in conjunction with the ESPS. It is often beneficial to combine two or more herbicides for control of a wide variety of emerged weeds. Dicamba and 2,4-D are often added to nonselective herbicides to improve control of weeds like cutleaf eveningprimrose and glyphosate-resistant horseweed.

Select rates and tank mix partners carefully. In some cases, PRE/POE herbicides are often slightly antagonistic with glyphosate; increased glyphosate rates should be used in this situation. This is especially true with difficult-to-control weed species and in situations where contact/burning-type herbicides are mixed with the systemic herbicide glyphosate. Large weeds and heavy pressure may make it necessary to apply two treatments. In some cases, this can be achieved by applying glyphosate or paraquat prior to planting and follow at or after planting with a second PRE/POE herbicide. The objective is to achieve burndown prior to crop emergence. Herbicide labels provide additional information and should be consulted prior to any application.

ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual bluegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Eveningprimrose	Henbit	Prostrate knotweed	Shepherdspurse	Wildlettuce	Virginia pepperweed	Vetch	Little barley	Horseweed	Curly dock (mature)	Ryegrass	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling Johnsongrass	Cocklebur	Entireleaf morng.	Pitted morng.	Smallflower morng.	P. Smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed	Sicklepod	Cutleaf groundcherry	Common ragweed	Red rice	Upright spurge	Soil activity
2,4-D	0	**8**	**9**	7	**8**	**10**	5	**8**	**8**	**9**	**9**	**9**	0	**8**	7	0	0	0	0	0	0	**8**	**10**	**10**	**9**	**8**	**8**	**8**	**9**	**9**	**8**	**9**	-	0	-	no
Dicamba	0	**8**	**9**	**8**	**8**	**10**	7	**8**	**8**	**9**	**9**	**9**	0	**9**	**9**	0	0	0	0	0	0	**9**	**10**	**10**	**9**	**8**	**9**	**9**	**9**	**10**	**9**	**9**	**9**	0	**9**	yes
Firstshot 50 SG	0	**9**	**9**	**8**	**8**	**8**	7	-	**9**	**9**	**9**	**9**	0	6	**9**	0	0	0	0	0	0	**8**	7	**8**	**8**	-	6	4	-	6	4	-	-	0	-	no
Goal 2XL	**9**	**10**	**9**	**8**	**8**	4	**9**	**9**	**9**	**9**	**8**	7	-	6	-	5	-	-	-	-	-	**8**	**8**	**9**	**9**	**8**	**9**	**9**	**8**	**9**	-	-	-	-	**9**	yes
Glyphosate	**10**	**10**	**9**	7	**10**	6	7	7	**10**	**8**	**8**	5	**10**	**8**	6	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	7	6	7	6	**10**	**8**	**9**	**9**	**8**	**10**	no
Glyphosate + 2,4-D	**10**	**10**	**10**	**9**	**10**	**9**	**8**	**-**	**10**	**10**	**9**	5	**10**	**9**	**8**	7	**9**	**9**	**10**	**9**	**9**	**10**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**10**	**8**	**9**	**9**	**8**	**10**	**yes**
Glyphosate + Canopy EX	**9**	**9**	**8**	7	**8**	7	**8**	-	**8**	-	-	**8**	**8**	7	**8**	6	**9**	**9**	**10**	**9**	**10**	**8**	**8**	**9**	**9**	7	**8**	**8**	**9**	**8**	**8**	**8**	**9**	**9**	**9**	yes
Glyphosate + Dicamba	**10**	**10**	**10**	**9**	**10**	**8**	**8**	-	**10**	**10**	**9**	**9**	**10**	**8**	**8**	7	**9**	**9**	**10**	**9**	**9**	**10**	**9**	**9**	**9**	**8**	**9**	**8**	**8**	**9**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Envive	**10**	**10**	**10**	**8**	**10**	**8**	**9**	**-**	**9**	**-**	**-**	**-**	**10**	**9**	**-**	**9**	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**8**	**8**	**9**	**-**	**-**	**-**	**10**	**8**	**9**	**9**	**9**	**10**	yes
Glyphosate + Firstshot SG	**10**	**10**	**10**	**8**	**10**	7	**9**	-	**10**	**9**	**10**	**9**	**10**	**8**	**9**	7	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**9**	**9**	**10**	7	-	-	**10**	**8**	-	-	-	-	no
Glyphosate + Goal 2XL	**10**	**10**	**10**	**8**	**10**	7	**9**	-	**10**	-	**10**	7	**10**	**8**	7	**8**	**9**	**9**	**9**	**8**	**9**	**8**	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	**8**	**9**	**9**	-	**10**	yes
Glyphosate + Sharpen	**10**	**10**	**9**	7	**10**	7	7	7	**10**	**9**	**8**	5	**10**	**9**	6	6	**10**	**10**	**10**	**9**	**10**	**8**	7	**8**	**8**	**8**	**8**	7	6	**10**	**8**	**9**	**9**	**8**	**10**	yes
Glyphosate + Synchrony XP	**10**	**10**	**9**	**8**	**9**	**8**	**8**	-	**9**	**9**	**9**	**9**	**10**	**8**	**9**	7	**10**	**10**	**10**	**9**	**10**	**9**	**8**	**8**	**9**	**9**	7	7	-	**9**	7	**8**	**9**	**8**	**9**	yes
Glyphosate + Valor	**10**	**10**	**10**	**8**	**10**	**8**	**9**	-	**9**	-	-	-	**10**	**8**	-	**9**	**10**	**10**	**10**	**9**	**10**	**8**	**8**	**8**	**8**	**9**	-	-	-	**10**	**8**	**9**	**9**	**9**	**10**	yes
Liberty	6	-	-	**8**	**10**	7	6	-	-	-	**9**	**8**	7	**9**	-	6	**8**	**8**	**8**	**8**	**8**	**9**	**10**	**10**	**9**	**8**	**8**	7	-	**8**	7	-	-	-	-	no
Metribuzin	**9**	**10**	**9**	7	**10**	6	**8**	6	**9**	**8**	6	6	**10**	5	-	6	7	**8**	7	7	**8**	7	7	7	7	**8**	**9**	**8**	**8**	**8**	7	7	**8**	4	4	yes
Paraquat	**10**	**10**	**10**	7	**10**	7	**9**	6	**9**	7	7	**8**	**8**	6	4	**8**	**9**	**9**	**9**	**8**	**9**	6	5	5	7	6	6	6	**8**	**9**	**9**	7	**8**	7	**8**	no
Paraquat + 2,4-D	**10**	**10**	**10**	**9**	**10**	**10**	**9**	-	**9**	-	**8**	**10**	**9**	**9**	**8**	6	-	-	-	-	-	-	-	-	-	**10**	-	**8**	-	-	-	-	-	-	-	no
Paraquat + Goal 2XL	**10**	**10**	**10**	**10**	**10**	7	**9**	-	**10**	-	5	**9**	**10**	**8**	5	6	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	**9**	yes
Paraquat + Metribuzin	**10**	**10**	**10**	**8**	**10**	**8**	**9**	6	**9**	**8**	**8**	**8**	**10**	**9**	-	**9**	**9**	**9**	**9**	**8**	**9**	7	7	7	7	**8**	**9**	**8**	**8**	**9**	**9**	7	**8**	7	**8**	yes

*Plus adjuvant if required according to label instructions.

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED WITH SOYBEAN HERBICIDES[a]

Herbicides / Weeds	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling johnsongrass	Rhizome johnsongrass	Fall panicum	Cocklebur	Entireleaf morningglory	Pitted morningglory	Palmleaf morningglory	Smallflower morningglory	Purple moonflower	Purslane	P. smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed, smooth, redroot	Palmer, spiny amaranth, tall waterhemp	Balloonvine	Sicklepod	Cutleaf groundcherry	Common ragweed	Yellow nutsedge	Annual sedge	Velvetleaf	Jimsonweed	Red rice	Spurge	Hophornbeam copperleaf	Showy crotolaria	Wild poinsettia	Vol. RR corn	Crop tolerance *(G = Good, F = Fair)*
Preplant[b] or PPI[b]																																		
Boundary	**8**	**8**	**8**	**8**	6	0	**8**	5	3	7	7	**8**	5	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	7	**9**	**9**	7	**9**	**8**	**8**	**9**	**9**	**9**	6	6	-	F
Canopy EX	**8**	**8**	7	7	6	2	7	**8**	**8**	**8**	**8**	**8**	-	**8**	**9**	**9**	7	-	**8**	**8**	-	**8**	-	-	**8**	**8**	**8**	7	5	**8**	**8**	-	**8**	-	G
Metolachlor/S-metolachlor	**8**	**8**	**9**	**9**	6	0	**9**	0	2	2	2	2	2	**9**	5	2	6	3	**9**	**8**	1	5	**9**	7	**9**	**9**	4	5	**9**	4	5	3	3	-	G
Outlook	**8**	**9**	**9**	**9**	6	0	**9**	0	2	2	2	2	2	**9**	5	2	6	3	**9**	**8**	1	6	**9**	7	7	**9**	4	5	**9**	4	5	3	3	-	G
Prowl or Treflan	**9**	**9**	**9**	**9**	**9**	3	**9**	0	2	2	2	2	1	**9**	2	0	0	0	**8**	7	1	4	-	-	**8**	**9**	4	5	**9**	-	-	3	-	-	G
Prowl or Treflan + Scepter	**9**	**9**	**9**	**9**	**9**	4	**8**	**9**	6	**8**	**8**	**8**	5	**9**	**9**	0	**8**	7	**10**	**9**	0	2	0	3	0	3	2	3	4	2	0	0	0	-	G
Prowl or Treflan + Metribuzin	**9**	**9**	**9**	**9**	**9**	3	**9**	5	2	6	7	**8**	5	**9**	**9**	**9**	**9**	**9**	**10**	**8**	4	5	**8**	7	4	**9**	6	**8**	5	6	7	-	7	-	G
Scepter	7	7	7	5	6	2	5	**9**	6	**8**	**8**	**8**	5	**9**	**9**	0	**8**	7	**10**	6	3	7	**9**	**8**	-	-	**9**	-	0	-	7	3	7	-	G
Treflan-2X or Prowl-2X	**10**	**10**	**10**	**10**	**9**	7	**9**	0	4	4	4	4	3	**10**	2	1	2	0	**9**	**8**	0	3	1	4	0	4	3	4	**8**	3	0	0	0	-	G
Preemergence																																			
Authority MTZ	6	6	6	5	4	0	6	7	**9**	**9**	**9**	**9**	-	**8**	**9**	**8**	**8**	-	**9**	**9**	-	7	-	**8**	7	7	**8**	**8**	-	**8**	**9**	-	**9**	-	F
Authority XL	6	6	6	5	5	2	6	**9**	**9**	**9**	**9**	**9**	-	**8**	**9**	5	4	-	**9**	**9**	-	6	-	**8**	**9**	**9**	**9**	**8**	4	**8**	**9**	-	**9**	-	F
Boundary	**8**	**8**	**8**	**8**	6	0	**8**	5	3	7	7	**8**	5	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	7	**9**	**9**	7	**9**	**8**	**8**	**9**	**9**	**9**	6	6	-	F
Canopy DF	7	6	7	7	7	3	7	**9**	**8**	**8**	**8**	**9**	6	**10**	**9**	**9**	**9**	**9**	**9**	**8**	**8**	7	**9**	**9**	5	**9**	**9**	**8**	**8**	**9**	**8**	-	**8**	-	F
Canopy EX	**8**	**8**	7	7	6	2	7	**8**	**8**	**8**	**8**	**8**	-	**8**	**9**	**9**	7	-	**8**	**8**	-	-	-	**8**	**8**	**8**	7	5	**8**	**8**	-	**8**	0	-	G
Command	**9**	**9**	**9**	**9**	**9**	3	**8**	6	4	7	6	6	3	**9**	**8**	4	**9**	**9**	4	0	5	0	0	5	-	-	**10**	**8**	7	**8**	**8**	3	**9**	-	G
Fomesafen	4	3	4	4	4	0	-	7	5	**8**	6	5	4	7	7	4	**8**	1	**8**	**8**	**-**	**7**	**8**	**7**	**7**	**1**	**-**	**4**	**3**	**-**	**-**	**-**	**6**	-	G
Gangster	5	5	5	5	5	0	6	0	**8**	**8**	**8**	7	**9**	**8**	**9**	**9**	**8**	**8**	**8**	**9**	**9**	7	7	**8**	7	5	**9**	**8**	**8**	6	**9**	**9**	-	-	G
Metolachlor/S-metolachlor	**8**	**8**	**9**	**9**	6	0	**9**	0	0	0	0	0	0	**9**	4	0	4	0	**9**	**8**	1	2	6	6	**9**	3	4	**8**	3	5	2	3	-	-	G
Metribuzin	**8**	6	**8**	7	5	0	7	6	2	7	2	**8**	6	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**9**	**9**	2	**9**	**8**	**8**	4	**9**	**9**	7	7	-	F
Outlook	**8**	**8**	**9**	**9**	6	0	**9**	0	0	0	0	0	0	**9**	4	0	4	0	**9**	**8**	1	3	4	**9**	5	5	4	3	4	**8**	3	5	-	-	G
Prefix	**9**	**8**	**9**	**9**	7	0	3	5	5	5	5	4	**9**	6	4	7	4	**9**	**8**	**8**	-	5	**9**	**9**	**9**	4	6	**8**	**9**	**9**	6	4	-	-	F
Prowl	**9**	**9**	**9**	**9**	**9**	3	**9**	0	2	2	2	2	1	**9**	2	0	4	0	**8**	7	0	2	0	3	0	3	2	3	4	2	0	0	0	-	G
Python	0	0	0	0	0	0	0	**8**	5	7	7	**8**	-	**9**	**9**	0	**9**	**9**	**9**	**9**	3	7	**9**	**8**	-	-	**9**	-	0	**9**	7	3	6	-	G
Scepter	7	7	7	5	7	2	5	**9**	6	**8**	**8**	**8**	5	**9**	**9**	0	**9**	7	**10**	6	**5**	5	-	7	4	**9**	6	**8**	5	6	7	-	7	-	G
Solicam	**8**	**8**	**9**	**8**	7	2	7	4	4	5	5	4	4	**9**	5	4	**8**	7	**8**	7	-	5	-	-	4	**9**	7	-	-	**8**	-	-	-	-	F
Synchrony XP	**8**	**8**	**8**	7	6	0	**9**	**9**	**9**	**9**	**9**	**9**	7	**8**	**8**	**8**	6	-	**8**	**8**	-	-	0	-	7	**8**	**8**	7	-	**8**	7	-	0	-	G
Valor	5	5	5	5	5	0	6	0	**8**	**8**	**8**	6	**9**	6	**9**	**9**	**8**	**8**	**8**	**9**	**9**	7	**8**	**8**	7	5	**9**	**8**	**8**	6	**9**	**9**	-	-	G
Valor XLT	6	6	6	6	6	0	7	**9**	**9**	**9**	**9**	6	**9**	**9**	**8**	**8**	**8**	**9**	7	7	7	7	5	**9**	**8**	**8**	5	**9**	**9**	6	**9**	**9**	-	-	G
Warrant	**8**	**8**	**7**	**7**	**5**	**3**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**4**	**0**	**5**	**2**	**8**	**8**	**-**	**3**	**9**	**5**	**7**	**8**	**3**	**4**	**8**	**3**	**-**	**3**	**3**	**-**	G
Postemergence-OT																																			
Assure II	**9**	**9**	**9**	**8**	**9**	**9**	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	**8**	G
Basagran	0	0	0	0	0	0	0	**9**	2	6	7	**9**	3	7	**9**	4	**8**	**8**	5	4	**8**	0	6	**9**	6	**8**	**9**	**8**	-	0	0	0	7	-	G
Basagran + 2,4-DB	0	0	0	0	0	0	0	**9**	5	**8**	**9**	**9**	5	7	**9**	5	**8**	**8**	5	4	**8**	0	6	**9**	6	**8**	**9**	**8**	-	0	0	0	6	-	F
Classic	0	0	0	0	0	0	0	**10**	**9**	**8**	**9**	**8**	**9**	5	**9**	**8**	2	4	**10**	6	5	7	-	**8**	6	**8**	**8**	**9**	0	0	4	-	**8**	-	G
Clethodim	**9**	**9**	**9**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	7	G
Cobra	4	4	4	4	3	2	3	**8**	**8**	**9**	**8**	**8**	**9**	**9**	6	**9**	**8**	6	**9**	**8**	**9**	5	**9**	**8**	3	6	**8**	**9**	0	**8**	**8**	**9**	**8**	-	F
First Rate	0	0	0	0	0	0	0	**9**	**8**	**9**	**8**	**9**	-	-	-	3	2	-	2	2	-	7	-	**8**	6	**8**	7	-	0	4	4	-	-	-	G
Fomesafen	3	3	3	3	3	3	2	**8**	**8**	**9**	**8**	**8**	**9**	**8**	7	**9**	2	2	**9**	**8**	**8**	3	**9**	**8**	6	7	-	**9**	0	5	**8**	**9**	**8**	-	G
Fusilade DX	**8**	**8**	**8**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	0	0	0	0	**8**	G
Fusion	**8**	**8**	**8**	**9**	**9**	**9**	**8**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	-	G
Glyphosate	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	7	**8**	**8**	**9**	**8**	**8**	**8**	7	7	7	**9**	**9**	**8**	**8**	**9**	**9**	7	**9**	7	**8**	**8**	**8**	**8**	**8**	**9**	-	G
Liberty	7	7	7	5	7	6	7	9	9	9	9	8	-	6	9	8	7	7	8	7	9	8	6	9	4	4	7	8	7	8	8	-	-	9	G
Poast Plus	**8**	**9**	**9**	**9**	**9**	7	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	G
Prefix	3	3	3	3	3	3	2	**8**	**8**	**9**	**8**	**8**	**9**	**8**	7	**9**	2	2	**9**	**8**	**8**	**9**	**8**	6	7	-	**9**	0	5	**8**	**9**	**8**	6	-	G
Scepter	2	2	3	3	6	5	5	**10**	5	6	6	7	5	**9**	7	2	3	2	**10**	6	0	3	-	6	5	7	3	0	2	3	3	0	7	-	G
Storm	3	4	3	3	3	0	2	**9**	**8**	**9**	**9**	**9**	7	**8**	**8**	**9**	7	7	**8**	**7**	**8**	2	**9**	**9**	6	**8**	**8**	**8**	0	6	7	**9**	6	-	G
Sequence	**9**	**9**	**9**	**8**	**10**	**9**	**9**	**10**	7	**8**	**8**	**9**	**8**	**8**	**8**	7	7	7	**9**	**9**	**8**	**8**	**9**	**9**	**7**	**9**	**7**	**8**	**8**	**8**	**8**	**8**	**9**	-	G
Ultra Blazer	3	4	3	3	3	2	2	5	**8**	**9**	**9**	**8**	**9**	**8**	7	**9**	1	2	**8**	7	**8**	3	**9**	**8**	3	5	-	**8**	2	7	**8**	**9**	7	-	G
Ultra Blazer + 2,4-DB	3	4	3	3	3	2	2	7	**8**	**9**	**9**	**8**	**9**	**8**	7	**9**	1	-	**8**	7	**8**	3	**9**	**8**	-	-	-	**8**	2	7	**8**	**9**	**8**	-	F
Postemergence-Directed																																			
2,4-DB	0	0	0	0	0	0	0	**9**	**9**	**9**	**9**	**9**	**9**	3	0	3	3	2	2	2	1	0	0	1	0	-	3	4	0	0	2	-	3	-	G
Lorox	7	7	**8**	7	7	0	7	7	**8**	**8**	**8**	**8**	7	**8**	7	**8**	**8**	**8**	**8**	**8**	**8**	7	**8**	**8**	-	-	6	7	6	7	7	-	7	-	G
Lorox+ 2,4-DB	7	7	**8**	7	7	0	7	**9**	**10**	**9**	**9**	**10**	**9**	**9**	7	**8**	**8**	**8**	**9**	**9**	**9**	**9**	**10**	**9**	2	-	7	**8**	6	7	**9**	-	**8**	-	G
Metribuzin	7		**8**	7	7	0	-	**8**	7	7	7	7	-	7	7	**8**	**8**	**8**	**8**	**8**	**8**	**8**	7	7	0	-	**8**	-	**8**	4	-	-	5	-	G
Metribuzin + 2,4-DB	7	7	**8**	7	7	0	-	**9**	**9**	**9**	**9**	**9**	**8**	3	7	7	**8**	**8**	**8**	**8**	**9**	**9**	**8**	**8**	0	-	**8**	7	**8**	4	**8**	-	7	-	G
Paraquat[c]	**9**	**9**	**9**	**8**	**8**	0	**8**	4	5	4	6	7	4	**8**	5	1	4	3	**8**	**8**	2	**8**	7	**8**	3	-	6	7	**9**	5	7	-	**8**	-	G

[a] Rating scale: 0 - 3 none to slight; 4 - 6 fair; 7 - 8 good; 9 - 10 excellent. Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions.

[b] An overlay treatment with the preemergence herbicides will control a broader spectrum of weeds, but the effectiveness on any given species may be no better than the highest rating for the best herbicide in the specific combination selected.

[c] Two applications.

[d] Roundup Ready® soybean cultivars only.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ROTATIONAL CROP RESTRICTIONS[1]

Soybean Herbicides	Rotation Interval						
	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat	Other Grains
2,4-D	none	3 m	1 m	1 m	1 m	1 m	1 m
Assure II	120 d	none	120 d	120 d	none	120 d	120 d
Authority MTZ	4 m	12 m	12 m	10 m	none	4 m	4 m
Authority XL	18 m	18 m	18 m	18 m	none	4 m	4 m
Authority XL – pH ≤ 7	10 m	12 m	10 m	10 m	none	4 m	4 m
Authority XL – pH > 7	18 m	18 m	18 m	18 m	none	4 m	4 m
Boundary	8 m	8 m	12 m	8 m	none	4.5 m	8 to 12 m
Canopy EX	7 m	8 m	9 m	9 m	none	3 m	3 m
Canopy – pH ≤ 7	9 m[2]	10 m	10 m	10 m	none	4 m	4 m
Canopy – pH > 7 (>3 oz/A)	18 m	18 m	18 m	18 m	none	4 m	4 m
Classic	9 m[4]	9 m	9 m	9 m	none	3 m	3 m
Clethodim	30 d	none	30 d	30 d	none	30 d	30 d
Command	9 m	none	9 m	9 m	none	12 m	12 m
Dicamba[3]	none	21 d	15 d	15 d	15 d	15 d	15 d
Enlite	9 m	9 m	9 m	9 m	none	4 m	4 m
Envive – pH ≤ 7	10 m	10 m	10 m	9 m	none	4 m	4 m
Envive – pH > 7	18 m	30 m	18 m	10 to 18 m	none	4 m	4 m
First Rate	9 m	9 m	9 m	9 m	none	3 m	9 to 30 m
Firstshot SG	14 d	14 d	7 d	none	7 d	none	7 d
Fomesafen	10 m	10 m	10 m	10 m	none	4 m	4 m[5]
Fusilade DX	60 d	none	60 d	60 d	none	60 d	60 d
Glyphosate	none	none	none	none	none	none	none
Goal 2XL	10 m	60 d	10 m	10 m	60 d	10 m	10 m
Gangster	9 m	9 m	9 m	9 m	none	3 m	9 to 18 m
Liberty	none	none	70 d	none	none	70 d	70 d
Lorox	none	4 m	none	4 m	none	4 m	4 m
Metolachlor/S-metolachlor	none	none	spring	spring	none	4.5 m	spring
Metribuzin	4 m	8 m	12 m	8 m	none	4 m	8 m[7]
Outlook	none	ns	ns	ns	none	4 m	4 m
Paraquat	none	none	none	none	none	none	none
Pendimethalin	none	none	10 to 12 m	spring	none	4 m	12 m
Poast Plus	none	none	none	none	none	none	none
Prefix	10 m	1 m	10 m	10 m	none	4.5 m	18 m
Python	0	18 m	12 m	6 m	none	4 m	4 to 18 m
Scepter	9.5 m[6]	18 m	11 m	spring	none	4 m	18 m
Sequence	none	none	none	spring	none	4 m	4 m
Sharpen[8]	none	3 m	none	15 d	0 to 30 d	none	none
Solicam	16 m	none	16 m	16 m	none	16 m	16 m
Spartan Charge	4 to 12 m	12 to 18 m	10 to 18 m	10 m	none	4 m	12 m
Treflan/Trifluralin	12 m	none	12 m	12 m	none	12 m	12 m
Valor	30 d	30 d	30 d	30 d	none	30 d	4 to 12 m
Valor XLT – pH ≤ 7	10 m	10 m	10 m	9 m	none	4 m	4 m
Valor XLT – pH > 7	18 m	30 m	18 m	18 m	none	4 m	4 m
Warrant	ns	ns	ns	ns	ns	4 m	ns

[1]d, m, y, spring, fall, and ns indicate days after application, months after application, years after application, spring following application, fall following application, and next season, respectively. PRE and POE indicate preemergence and postemergence applications, respectively.

[2]May be recropped to field corn after 9 months if Canopy rate does not exceed 6 oz/A.

[3]For 8 oz/A use rate. At least 1 inch of rainfall or overheard irrigation required before waiting interval begins.

[4]Rotation interval is only 8 months if soil pH < 6.8.

[5]Oats may be planted 18 months following application.

[6]Field corn may be planted in the spring of the year following a single application unless extreme drought conditions develop (less than 10 inches of rainfall or irrigation is received within 6 months following the date of application).

[7]Barley may be planted 4 months following application.

[8]Rotational restrictions are rate dependant. Consult the label for more information.

[9]18 months for rates above 8 oz/A.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant — Foliar (PPF)				
dicamba at 0.25 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 gal water by ground or 5 gal water by air.	Preplant up to 14 days before planting. (See specific instructions.)	Horseweed, clovers, and several other winter and summer annual, biennial, and perennial broadleaf weeds.	A minimum accumulation of 1 inch of rainfall or overhead irrigation, followed by a 15-day waiting interval, is required before planting soybean. Do not apply this product near emerged soybean.
Fallow cultivation	Use several fallow cultivations over a 4- to 6-week period.	Preplant.	Johnsongrass and emerged annual weeds.	Disk-harrow appears more effective than field cultivator when used alone for johnsongrass control. Alternate use of the two implements is equally effective as disking alone and will be more economical. More effective in dry weather than during wet periods. For annual weeds, less frequent and shallow cultivations should be made to conserve fuel and soil moisture.
2,4-D at 0.5 to 1 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	14 to 30 days before planting. Rainfall before planting is recommended.	Several winter and summer annual, biennial, and perennial broadleaf weeds.	Use in combination with glyphosate, glufosinate, or paraquat to improve weed control spectrum. Ester formulations are usually more effective than amine formulations in controlling curly dock and wild garlic. As a general rule, apply esters when temperatures are less than 60° and amines when more than 60°. Follow Bureau of Plant Industry regulations for phenoxy herbicides.
glyphosate at 0.375 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preplant up to crop emergence.	Several winter and summer annual, biennial, and perennial broadleaf weeds. **See below and label for complete list of weeds controlled.**	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. **Avoid drift to nontarget species or areas.** Do not use with galvanized (zinc-coated) spray equipment.

Weed and height	lb ae/A
Barnyardgrass up to 4 in; morningglory sp. and sicklepod up to 2 in; annual bluegrass, chickweed, corn, horseweed, London rocket, and shepherdspurse up to 6 in; barley, buttercup, cocklebur, crabgrass, Carolina foxtail, seedling johnsongrass, fall panicum, redroot and smooth pigweed, rye, and grain sorghum up to 12 in; and wheat up to 18 in.	0.375
Same as above plus sicklepod and broadleaf signalgrass up **to 4 in**; barnyardgrass **up to 6 in**; and horseweed **up to 12 in**.	0.56
Same as above plus prickly sida **up to 4 in**; red rice **up to 6 in**; goosegrass and Carolina geranium **up to 12 in**; sowthistle (wild lettuce), common and giant ragweed, P. smartweed,*Bromus* sp., *Panicum* sp., sunflower up to 6 in; and rhizome johnsongrass **in the boot-to-head stage**.	0.75
Same as above plus sowthistle (wild lettuce), common and giant ragweed, P. smartweed, *Bromus* sp., *Panicum* sp., and sunflower more than 6 in.	1.125
Same as above plus ryegrass.	1.5

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin at 0.032 to 0.08	Valor — 1 to 2.5 oz in 15 gal of water by ground. Always add crop oil concentrate or methylated seed oil at 1qt/A or an 80% active nonionic surfactant at 0.25% (v/v). Additional adjuvant may not be required when tank mixing with products that have been formulated with a suitable adjuvant.	Before, during, or after planting, **but before crop emerges.**	Several summer and winter annual weeds. Improved control of cutleaf eveningprimrose when tank mixed with glyphosate.	Use with herbicides like glyphosate, paraquat, or 2,4-D to broaden weed control spectrum. Do not apply more than 3 ounces of Valor per season. **Do not use Valor in soybeans in the same field flufenacet (Axiom/ Domain), metolachlor (Dual/ Dual Magnum) or dimethenamid (Frontier/Outlook) will be used as injury may occur**. Valor at 2 ounces per acre or more will provide residual control of several weeds.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0456 + 0.0144 + 0.0045 to 0.073 + 0.023 + 0.0073 lb	Envive — 2.5 to 4 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Envive may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply preemergence to coarse soils or to Black Belt soils with a pH greater than 7. Do not apply more than 4 ounces per season.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0634 + 0.005 + 0.0154 lb	Enlite — 2.8 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Enlite may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply more than 2.8 ounces per season.
oxyfluorfen at 0.25 to 0.5 lb	Goal 2XL — 1 to 2 pt in 10 to 20 gal water by ground or 5 to 10 gal water by air. Always include 0.25% to 0.5% v/v of an 80% active nonionic surfactant.	Preplant up to 60 days before planting. (See specific instructions.)	Several winter and summer annual weeds.	Use in combination with glyphosate, paraquat, and/or 2,4-D to improve weed control spectrum. Soybean may be planted within 7 days after application if significant rainfall has occurred and the soil has been tilled to incorporate the treatment to a depth of at least 2.5 inches.
paraquat at 0.5 to 0.75 lb	Paraquat — 32 – 48 fl oz in a minimum of 10 gal by ground or 5 gal by air. Add 1 to 2 pt/100 gal spray nonionic surfactant.	Before soybeans emerge.	Most small emerged annual weeds.	Apply as broadcast spray to wet weed growth. Use 32 fluid ounces when applying to 1- to 3-inch weeds or with Metribuzin/ Lexone, 48 fluid ounces to 3- to 6-inch weeds and 3 pints to 6-inch or larger weeds. May be tank mixed with most preemergence herbicides. **Do not (1) apply under windy conditions; or (2) graze or feed treated forage to livestock.**
chlorimuron + tribenuron at 0.0156 + 0.0046 lb to 0.0312 + 0.0094 lb	Canopy EX — 1.1 to 2.2 oz in 10 to 20 gallons of water by ground equipment. Add 0.25% nonionic surfactant or 1% v/v crop oil concentrate. Higher rates can be used to control larger weeds or to provide extended residual control.	Before soybean emergence.	Several summer and winter annual weeds.	Canopy EX may be tank-mixed with glyphosate, paraquat, or 2,4-D to broaden weed control spectrum. Do not apply to Black Belt soils with a pH greater than 7 or a history of nutrient deficiency.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 4 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
saflufenacil at 0.0223 to 0.0446 lb	Sharpen — 1 to 1.5 oz in 10 to 20 gal of water by ground. Always add 1% v/v methylated seed oil (MSO). Addition of AMS at 1–2% w/v water recommended.	Before or after planting, but before crop emergence. 14-day preplant interval required for 1.5 oz/A use rate.	Horseweed and many other broadleaf weeds. Use lower rate for 1- to 2-inch horseweed. Use higher rate for 3- to 4-inch horseweed.	Sharpen can be tank-mixed with glyphosate, glufosinate, or paraquat to improve control of other emerged weeds. Do not apply more than 4 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to soils classified as coarse or having less than 2% organic matter.
thifensulfuron + tribenuron at 0.13 + 0.13 oz to 0.2 + 0.2 oz	Firstshot 50 SG — 0.5 to 0.8 oz in 10 to 20 gal water by ground or in 3 to 5 gal by air. Always add an NIS at 0.25% v/v or 1% v/v of a crop oil concentrate.	Up to 7 days before planting. See additional comments in specific instructions and remarks section.	Several winter and summer annual as well as perennial broadleaf weeds. Especially good on wild garlic and curly dock.	Thorough coverage of target weeds is essential. Warm temperatures and good soil moisture before, during, and after application are needed for optimum control. Visible symptoms of dying weeds may not appear for 1 to 2 weeks. Sequential applications may be made as long as total amount applied during a single preplant season does not exceed 1 ounce per acre. Allow at least 30 days between applications. The single application rate can be as high as 0.8 ounce per acre. When applied on light-textured soils, such as sandy loam, sandy, or silt loam soils, extend the time to planting by an additional 7 days. It can be applied with glyphosate or paraquat as a burndown treatment, with the Firstshot improving control of broadleaf weeds and volunteer Roundup Ready soybean.
Preplant — Incorporated				
dimethenamid-P at 0.47 to 0.98 lb	Outlook — 10 to 21 oz in 2 or more gallons of water to obtain ground coverage.	Up to 2 weeks before planting.	Most annual grasses including broadleaf signalgrass and red rice, and small seeded broadleaf weeds.	Uniformly incorporate to a depth of 1 to 2 inches. Poor control of most large-seeded broadleaf weeds. See label for tank mixtures. May cause temporary growth suppression of soybeans with high rainfall and water-saturated soil. Do not use more than 21 ounces of Outlook per season.
imazaquin at 0.125 lb	Scepter 70DG — 2.86 oz in 10 to 20 gal water by ground equipment. For cocklebur and pigweed control only on sands or loamy sands, apply 2.14 oz.	Within 45 days of planting during seedbed preparation. If planting on beds, apply and incorporate after bed formation (See label).	Cocklebur, pitted, palmleaf and smallflower morningglory, pigweeds, prickly sida, smartweed, and common ragweed.	Set implements (see label) to incorporate Scepter into the top 1 to 2 inches of soil. If sufficient rainfall is not received within 7 days after application, use a rotary hoe to control emerged weeds. Susceptible weeds **will emerge**, stop growing, and either die or remain stunted. Internode shortening of soybean plants may occur. **Do not** (1) apply more than 0.25 pound of active ingredient per acre Scepter per growing season, (2) graze or feed treated soybean forage, hay, or straw to livestock. Only rotational crops harvested at maturity may be used for feed or food. **Avoid drift** to nontarget species or areas.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin or trifluralin at 0.5 to 0.75 to 1.0 lb	Prowl H_20 — 1.2 to 1.8 to 2.4 pt or Trifluralin 4L — 1 to 1.5 to 2 pt or Treflan 5 — 0.8 to 1.2 to 1.6 pt in 10 to 20 gal water.	Prowl — 60 days; Treflan — several weeks to immediately before planting in spring.	Most annual grasses and some small-seeded annual broadleaf weeds such as pigweeds and purslane.	Incorporate 1 to 2 inches deep. Immediate incorporation is strongly recommended. The following losses can occur if incorporation is delayed 24 hours: Prowl - 15% and Treflan - 30%. When making band applications, avoid removal of treated soil from the seedbed during planting. If stand failure occurs, replant soybeans, but do not re-treat. Prowl — increase rate by 0.5 pint on medium-textured soils and 1 pt on fine-textured soils if heavy weed populations are anticipated.
pendimethalin or trifluralin tank mix with metribuzin at 0.5 + 0.25 to 0.75 + 0.37 to 1.0 + 0.5 lb	Prowl H_20 — 1.2 to 1.8 to 2.4 pt or Trifluralin 4L — 1 to 1.5 to 2 pt or Treflan 5 — 0.8 to 1.2 to 1.6 pt plus Metribuzin — 0.5 to 0.75 to 1 pt or 75% DF — 0.33 to 0.5 to 0.67 lb in 10 to 20 gal water. For improved sicklepod control — Apply to the above, an additional 0.25 pt 4L or 0.17 lb 75% Metribuzin surface preemergence.	Treflan mixture — within 14 days of planting. Prowl mixture — within 7 days of planting.	Most grasses from seed, pigweeds, purslane, hemp sesbania, prickly sida, smartweed, and sicklepod.	**Do not use Metribuzin** on coarse soils with less than 1% OM, on soils with a **calcareous surface area or pH 7.5 or higher.** Metribuzin/Lexone are not suggested for use on fields subject to water standing following heavy rainfall, or on fields planted to sensitive varieties. Incorporate the mix within 24 hours of application. Immediate incorporation is suggested. Losses of 15% and 30% of Prowl and Treflan, respectively, can occur if incorporation is delayed 24 hours. Set incorporation equipment to mix the herbicides into the top 2 to 3 inches of soil. Plant soybeans 1.5 to 2 inches deep. If stand failure occurs, replant but **do not** re-treat.
S-metolachlor + metribuzin at 0.98 to 2.4 lb	Boundary — 1 to 2.5 pt in a minimum of 10 gal water by ground and 2 gal water by air.	From 0 to 30 days before planting.	Annual grasses, pigweeds, prickly sida, hemp sesbania, sicklepod, smartweed, spurge, velvetleaf.	Injury may occur (1) on soils with calcareous surface or pH 7.5 or above; (2) to certain soybean varieties, see label for list; (3) on soil with less than 0.5% organic matter; (4) when soybeans are planted less than 1.5 inches deep; (5) when heavy rains follow application, especially in poorly drained areas where water may stand several days. Do not use Boundary rates above 1.25 pints per acre on soils above pH 7.0. Don't use on sands with less than 0.5% organic matter. Treated forage and vines may be fed to livestock 40 days after application.
Preemergence				
clomazone at 1.0 to 1.25 lb	Command 3ME — 2.6 to 3.3 pt in 10 to 20 gal water by ground. Select rates according to soil type and anticipated weed pressure. Add a drift-reducing agent according to manufacturer's label.	At planting.	Most annual grasses, seedling johnsongrass, prickly sida, Pennsylvania smartweed, purslane, spotted spurge, velvetleaf, and wild poinsettia.	**Do not** (1) apply within 1,500 feet of towns or subdivisions, or commercial vegetables, greenhouses, or nurseries; (2) graze or feed forage, hay, or straw from treated fields to livestock; (3) apply with aerial equipment. Use caution to minimize spray drift as off-site movement can cause foliar whitening or yellowing of plants.
cloransulam-methyl at 0.032 to 0.039 lb	Firstrate — 0.6 to 0.75 oz/A in 10 gal or more water.	For best results, apply within 2 weeks of planting for preplant applications and within 2 days after planting for PRE applications. Can be applied 15 to 30 days preplant.	Horseweed, morningglory, prickly sida, cocklebur, jimsonweed, pigweed, common ragweed, giant ragweed, smartweed, sunflower, velvetleaf.	At least 0.5 inches rainfall needed for incorporation. Apply with glyphosate or other nonselective herbicides to remove any existing vegetation. Can be applied with other PRE herbicides to broaden weed control spectrum. Available in a co-pack with Valor called **Gangster**.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
dimethenamid-P at 0.47 to 0.98 lb	Outlook — 10 to 21 oz in 2 or more gallons of water to obtain ground coverage.	0 to 14 days before planting.	Most annual grasses including broadleaf signalgrass and red rice, and small-seeded broadleaf weeds.	Poor control of most large-seeded broadleaf weeds. See label for tank mixtures. May cause temporary growth suppression of soybeans with high rainfall and water-saturated soil. Do not use more than 21 ounces of Outlook per season.
S-metolachlor + metribuzin at 0.98 to 2.4 lb	Boundary — 1 to 2.5 pt in a minimum of 10 gal water by ground and 2 gal water by air.	From 0 to 30 days before planting.	Annual grasses, pigweeds, prickly sida, hemp sesbania, sicklepod, smartweed, spurge, velvetleaf.	Injury may occur (1) on soils with calcareous surface or pH 7.5 or above; (2) to certain soybean varieties, see label for list; (3) on soil with less than 0.5% organic matter; (4) when soybeans are planted less than 1.5 inches deep; (5) when heavy rains follow application, especially in poorly drained areas where water may stand several days. Do not use Boundary rates above 1.25 pints per acre on soils above pH 7.0. Don't use on sands with less than 0.5% organic matter. Treated forage and vines may be fed to livestock 40 days after application.
flumetsulam at 0.80 to 1.06 oz	Python 80WDG — 1.0 to 1.33 oz in 10 to 40 gal by ground equipment.	After planting but before emergence.	Broadleaf weeds.	**Do not** (1) apply more than 1.4 ounces of Python WDG in a year; (2) exceed 0.07 lb flumetsulam per year; (3) apply to soils with a pH of 7.8 or higher; (4) aerially apply.
flumioxazin at 0.063 to 0.096 lb	Valor — 2 to 3 oz/A in 10 to 30 gal water by ground or 7 to 10 gal water by air. Add crop oil concentrate or methylated seed oil at 1 qt/A or an 80% active nonionic surfactant at 0.25% v/v if emerged weeds are present at planting. Additional adjuvant may not be required when tank mixing with products that have been formulated with a suitable adjuvant.	Before or after planting, but before crop emerges. Can be used in a fall and spring burndown program as well.	Prickly sida, morningglory, pigweeds, horseweed, and several other small-seeded summer annual, winter annual, and biennial broadleaf weeds.	Can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at time of application. Limited annual grass control. Soybean injury has been observed under extended cool and wet growing conditions following planting. Injury may also occur if incorporating rainfall occurs as seedlings are cracking. To reduce the likelihood of injury, use Valor as a preplant herbicide and allow rainfall to occur before planting. Soybean plants injured with Valor usually recover with no yield loss, but some delay in maturity may occur. Do not apply more than 3 ounces of Valor per season. **Do not use Valor in soybeans in the same field where flufenacet (Axiom/Domain), alachlor, metolachlor (Dual/Dual Magnum), or dimethenamid (Frontier/Outlook) will be used, as injury will occur.** Can be mixed with a variety of other herbicides to broaden weed control spectrum. Available in a co-pack with Firstrate called **Gangster.**
flumioxazin + chlorimuron at 0.06 + 0.02 lb **For use in soybean only**	Valor XLT – 3 oz in at least 10 gal by ground and 3 to 5 gal by air. Add crop oil concentrate or methylated seed oil at 1 qt/A or an 80% active nonionic surfactant at 0.25% v/v if emerged weeds are present at planting. Additional adjuvant may not be required when tank mixing with products that have been formulated with a suitable adjuvant.	Before or after planting, but before crop emerges. Can also be used in a fall or spring burndown program.	Prickly sida, morningglories, pigweeds, horseweed, and several other small-seeded summer annuals, winter annuals, and biennial broadleaf weeds.	Valor can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at application. It provides limited annual grass control. Soybean injury has been observed under extended cool and wet growing conditions after planting. Injury may also occur if incorporating rainfall occurs as seedlings are cracking. To reduce the likelihood of injury, use Valor as a preplant herbicide and allow rainfall to occur before planting. Soybean plants injured with Valor usually recover with no yield loss, but some delay in maturity may occur. Do not apply more than 3 ounces of Valor per season. Do not use Valor in soybean fields where flufenacet (Axiom/Domain), alachlor, metolachlor (Dual/Dual Magnum), or dimethenamid (Frontier/Outlook) will be used, as injury will occur. Valor can be mixed with a variety of other herbicides to broaden weed control spectrum. Valor XLT has increased morningglory, annual grass, cocklebur, and sicklepod control and longer residual control of glyphosate-resistant horseweed (a.k.a. marestail).

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin + cloransulam at 0.06 + 0.02 lb	Gangster — Copack of Valor and FirstRate applied at 2.4 oz/A results in 2 oz/A of Valor and 0.4 oz/A of FirstRate. Add crop oil concentrate or methylated seed oil at 1 qt/A or an 80% active nonionic surfactant at 0.25% v/v if emerged weeds are present at planting. Additional adjuvant may not be required when tank mixing with products that have been formulated with a suitable adjuvant.	Before or after planting, but before crop emerges. Can also be used in a fall or spring burndown program.	Prickly sida, morningglory, pigweeds, horseweed, and several other small-seeded summer annual, winter annual, and biennial broadleaf weeds. Provides longer residual control of horseweed (a.k.a. marestail) when used in a fall or spring burndown program than Valor alone. Also provides suppression to control of existing horseweed present at time of application.	Gangster can be mixed with glyphosate, paraquat, or glufosinate to kill weeds present at application. It provides limited annual grass control. Soybean injury has been observed under extended cool and wet growing conditions after planting. Injury may also occur if incorporating rainfall occurs as seedlings are cracking. To reduce the likelihood of injury, use Valor as a preplant herbicide and allow rainfall to occur before planting. Soybean plants injured with Valor usually recover with no yield loss, but some delay in maturity may occur. Do not apply more than 3 ounces of Valor per season. Do not use Valor in soybean fields where flufenacet (Axiom/Domain), alachlor, metolachlor (Dual/Dual Magnum), or dimethenamid (Frontier/Outlook) will be used, as injury will occur. Gangster can be mixed with a variety of other herbicides to broaden weed control spectrum. Gangster has increased morningglory and horseweed control and longer residual control of glyphosate-resistant horseweed (a.k.a. marestail).
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0456 + 0.0144 + 0.0045 to 0.073 + 0.023 + 0.0073 lb	Envive — 2.5 to 4 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Envive may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply preemergence to coarse soils or to Black Belt soils with a pH greater than 7. Do not apply more than 4 ounces per season.
flumioxazin + chlorimuron ethyl + thifensulfuron methyl at 0.0634 + 0.005 + 0.0154 lb	Enlite — 2.8 oz in 10 to 20 gallons of water by ground equipment.	Early preplant to preemergence.	Several summer and winter annual broadleaf weeds.	Enlite may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. Do not apply more than 2.8 ounces per season.
fomesafen at 0.25 to 0.375 lb	Fomesafen — 1 to 1.5 pt	At planting but prior to crop emergence	Most small-seeded broadleaf weeds, especially pigweeds and prickly sida. Partial control of small-seeded annual grasses.	**Do not** exceed 1.5 pints per acre per season. Sufficient weed control depends on adequate rainfall after application to activate the herbicide. Temporary injury or leaf burn to soybean can result if rainfall occurs soon after crop emergence; new soybean growth emerging after rainfall will have a normal appearance.
imazaquin at 0.125 lb	Scepter 70DG — 2.86 oz in 10 to 20 gal water by ground equipment. **In no-till** or **doublecrop behind wheat,** use at least 20 gal water plus 0.25% (v/v) nonionic surfactant and apply with ground equipment.	At planting or before soybeans emerge.	Cocklebur, pitted, palmleaf and smallflower morningglory, pigweeds, prickly sida, smartweed, and common ragweed, sicklepod — followed by Scepter or other effective herbicide (see postemergence guidelines).	If sufficient rainfall is not received within 7 days after application, use a rotary hoe to control emerged weeds. Susceptible weeds will emerge, stop growing, and either die or remain stunted. Internode shortening of soybean plants may occur, but this has not affected yields. Scepter may be applied in combination with a grass or broadleaf herbicide registered for preemergence application or following a grass herbicide registered for PPI application in soybeans. **Do not** (1) apply more than 0.25 pound of active ingredient per acre of Scepter per growing season; (2) graze or feed treated soybean forage, hay, or straw to livestock. Only rotational crops harvested at maturity may be used for feed or food. **Avoid drift** to nontarget species or areas.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 4 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metolachlor at 1.5 to 2.5 lb or S-metolachlor at 0.95 to 1.6 lb	metolachlor/S-metolachlor — 1.5 to 2.5 pt/1 to 1.66 pt. **See table below.**	At planting.	Most annual grasses and pigweed.	If stand failure occurs, **do not** re-treat unless replanting is in the middles. Rainfall is required for optimum control.

Pt with Organic Matter Up to 3%*

Soil Texture	Metolachlor	*S*-metolachlor
Coarse — sandy to sandy loam	1.5 to 2.0	1.00 to 1.33
Medium — loam to silt loam	2.0 to 2.5	1.33 to 1.67
Fine — sandy clay loam to clay	2.0 to 2.5	1.33 to 1.66

*Use the lower rate for soils with organic matter less than 1% and the higher rate for soils with organic matter greater than 1%.

S-metolachlor + fomesafen at 1.09 + 0.24 lb	Prefix 5.29EC — 2 pt in 10 or more gal by ground or 3 to 5 gal by air.	At planting.	Annual grasses and broadleaves. Excellent on pigweeds.	A maximum of 3 pints per acre can be applied within a single cropping season (includes preemergence and postemergence timings). Injury can occur if Prefix is applied at soybean cracking or after soybean emergence if rainfall occurs after soybean emergence.
metribuzin at 0.25 to 0.625 lb	Metribuzin — apply in 10 to 40 gal water. **See table below.**	At planting.	Hemp sesbania, prickly sida, early sicklepod, and most annual grasses and small-seeded broadleaf weeds.	**Crop injury may occur on soils having a calcareous surface area or pH 7.5 or above.** Soybean stand reductions may occur when heavy rainfall immediately follows application. **Do not apply to fields subject to water standing following heavy rainfall or to fields planted to sensitive varieties.** Plant soybean seed at least 1.5 inches deep. For sicklepod, use the high side of the soil type rate range given in the table.

0.5% Organic Matter or Greater*

		Metribuzin				
Soil texture		**4L**	**75DF**		**4L**	**75DF**
		(pt)	(lb)		(pt)	(lb)
Coarse	Loamy sand, sandy loam	0.50	0.33	to	0.75	0.50
Medium	Loam, silty loam, silt	0.75	0.50	to	1.00	0.67
Fine	Silty clay loam, clay loam, clay	1.00	0.67	to	1.25	0.83

*Do not use on sand or on any soil with less than 0.5% organic matter; use the higher rates on soils with higher organic matter.

metribuzin + chlorimuron at 2.57 + 0.43 to 3.86 + 0.64 oz	Canopy DF — 4 to 6 oz/A. Apply in 15 gal water by ground. Add 0.25% v/v NIS or 1% v/v COC if vegetation is present at time of application.	From 0 to 45 days before planting.	Cocklebur, hemp sesbania, prickly sida, annual morningglory, early-emerging sicklepod, smartweed, ragweed, spotted spurge, and most small-seeded broadleaf weeds.	Do not apply more than 3 ounces per acre on soil with pH> 7.0. Do not apply to Black Belt soils with pH >7.0 or history of nutrient deficiency. Do not apply to field planted to metribuzin-sensitive soybean cultivars (See Metribuzin label or consult Extension representatives or variety trial publications for sensitive varieties). Do not apply on soils with a calcareous surface layer or pH>7.5. Canopy may be applied in combination with PRE grass herbicides or following a PPI grass herbicide application. Canopy can be used at reduced rates when followed by a planned postemergence application of conventional herbicides or glyphosate in glyphosate tolerant soybean. Tank-mix with Paraquat or Glyphosate in a burndown situation to improve overall weed control and provide residual control of broadleaf and grass weeds.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
norflurazon at 0.48 to 2 lb	Solicam — 0.6 to 2.5 lb in 10 to 20 gal water or 0.95 to 1.25 lb in 10 to 20 gal water preplant incorporated and surface preemergence.	At planting **or ½ rate** preplant incorporated within 30 days of planting **plus** ½ rate at planting.	Most annual grasses, small-seeded broadleaf weeds and prickly sida. Inadequate control of morningglory, cocklebur and hemp sesbania. Excellent on prickly sida.	**Do not apply to sand, loamy sand or sandy loam soil.** If stand failure occurs, cotton, soybeans or peanuts may be planted through the treated band with minimum disturbance of the treated soil or the area may be reworked. Rebedding without disturbing the treated area should not be done. **At least 1/2-inch rainfall within 2 weeks after preemergence application is needed for control.**
pendimethalin at 0.5 to 0.75 to 1.0 lb	Prowl H_20 — 1.2 to 1.8 to 2.4 pt	Within 2 days after planting	Most grasses from seed and some small-seeded broadleaf weeds such as pigweed and purslane.	Rainfall or overhead irrigation is needed within 7 days for activity. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration or drought can weaken seedlings and increase the possibilty of crop damage.
sulfentrazone + carfentrazone-ethyl at 0.14 + 0.016 to 0.21 lb + 0.023 lb	Spartan Charge — 5.75 to 8.5 fl oz in at 10 gal water by ground.	Apply preplant, preemergence to 3 days after planting but before crop emergence.	Residual activity on nutsedge. Controls pigweed, morningglory, and many other summer annual broadleaf species.	Do not apply more than 8.5 fluid ounces per acre per 12-month period. Soybean chlorosis and stunting may occur at pH 7.5 and above, as well as under cold and wet growing conditions. Do not use on soils classified as sand, which have less than 1% organic matter.
sulfentrazone + metribuzin at 0.09 + 0.135 to 0.2 + 0.3 lb/A	Authority MTZ — 8 to 18 oz in 10 gal of water by ground	Before or after planting, but before crop emergence. Can also be used in fall or spring burndown programs or preplant incorporated.	Provides some postemergence activity on emerged weeds. Provides excellent residual control of most annual broadleaf weeds, including pigweed, morningglory, and prickly sida.	Authority MTZ can be mixed with glyphosate, glufosinate, or paraquat to improve control of emerged weeds. Do not apply more than 33 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to soils classified as coarse or having less than 1% organic matter.
sulfentrazone + chlorimuron ethyl at 0.12 + 0.015 to 0.3+ 0.04 lb/A	Authority XL — 3 to 8 oz in 10 gal of water by ground	Before or after planting, but before crop emergence. Can also be used in fall or spring burndown programs or preplant incorporated.	Provides excellent residual control of most annual broadleaf weeds, including pigweed, morningglory, and prickly sida.	Authority XL can be mixed with glyphosate, glufosinate, or paraquat to improve control of emerged weeds. Do not apply more than 9.6 ounces per year. Do not apply after soybean emergence or severe injury may occur. Do not apply to Black Belt soils with a pH of more than 6.8 or history of nutrient deficiency.

Postemergence

Cultivation. Use so that the soil moved will not interfere with subsequent use of postemergence treatment. Cultivation will not normally detract from the control obtained from previously applied herbicides, but will frequently offer an economical means of extending or completing control established by chemicals when weeds emerge in the treated drill. However, cultivation within 7 days before or after a postemergence herbicide application may reduce control from that treatment. Deep cultivation (more than 2 inches) is usually not necessary and may damage the crop.

Rotary hoeing	Broadcast or on a band.	As soon as soybeans are up to a stand. Afterward as needed, but no later than the third trifoliolate leaf stage.	Newly emerged annual grasses and small-seeded broadleaf weeds.	Most effective when weeds are breaking through slightly crusted soil; gives poor control on damp or wet soil. When soybeans are in first or second trifoliolate leaf stage, rotary hoe only after plants have lost some turgidity (slightly wilted).

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks

Early Postemergence

Reduced Rate Considerations. Research has shown that rates of several herbicides applied early postemergence may be reduced to as much as one-half the suggested use rates with satisfactory results **for some weedy species.** User must understand: (1) using rates below labeled rates are at the **user's sole risk,** and (2) results may be unsatisfactory unless ideal conditions exist at the time of application. These ideal conditions are (1) good soil moisture, (2) air temperature between 85-90 °F, (3) relative humidity above 60%, and (4) susceptible weeds in the first true leaf stage. **DO NOT** use the reduced rates unless all of these conditions are met. Accurate sprayer calibration and precise application are very important at reduced rates. Begin treating 4 to 5 days after weeds emerge using a spray volume of approximately 20 gpa. After 7 days, use the label rates. Later applications and/or cultivation will usually be required.

Early Postemergence

acetochlor at 0.9375 to 1.5 lb	Warrant — 1.25 to 2 qt in 10 to 20 gallons of water by ground equipment.	Soybean emergence to R2. Optimum timing is when soybeans are V2-V3.	Residual activity on annual grasses and pigweed. Will not control emerged weeds.	Warrant should be applied postemergence to soybean but before weed seedling emergence. It may be tank-mixed with glyphosate in Roundup Ready soybean. Do not apply more than 4 quarts per season.
acifluorfen at 0.25 to 0.375 to 0.50 lb, or at 0.375 to 0.50 + 0.03 lb 2,4-DB.	Ultra Blazer 2L — 1 to 1.5 to 2 pt in 5 to 10 gal water by air or in 20 to 40 gal water by ground. **See table below.** Add 2 oz of a 2 lb/gal formulation of 2,4-DB + 1 pt surfactant when cocklebur or morningglory exceed the growth stages listed in the table up to 12 inches and apply with ground equipment.	According to weed growth stage. **See table below.**	**See table below.**	**Do not apply** to soybeans and weeds under stress conditions, within 50 days of harvest (60 days for the 2,4-DB tank mix), or more than 4 pints per acre per growing season. Rainfall within 6 hours of application may reduce control. Avoid drift to other crops. The 2,4-DB tank mixture will cause soybean foliage damage and may reduce yields. **Ultra Blazer causes eye damage** — Rinse eyes immediately with water. **SHAKE WELL** before using. **Do not** use (1) the 5-gallon aerial spray volume except for late-season control of hemp sesbania; (2) crop oil concentrate with the 2,4-DB mix.

	Growth stage		
Weed to be controlled	**No. leaves (maximum)**	**80% ai Surfactant (pt/100 gal)**	**Ultra Blazer 2L rate (pt)**
Hemp sesbania	up to 12 inches	2	1.0
Showy crotalaria	Before bloom	2	1.0
Purple moonflower	4	1	1.5
Pitted morningglory	4	1	1.5
Redroot pigweed	4	1	1.5
Smooth pigweed	4	1	1.5
Other morningglory	3	1	2.0
Common purslane	Multi (6-in. diam.)	1	1.5
Lanceleaf groundcherry	4	1	2.0
Cutleaf groundcherry	4	1	2.0
Common cocklebur	2	1	2.0[1]

[1]Basagran at 1 pt may be added to control 6-leaf cocklebur.

Crop, weed, or situation and active chemical per treated land acre	**Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)**	**Time of application**	**Weeds controlled**	**Special instructions and remarks**
acifluorfen + bentazon at 0.75 lb	Storm 4S (1.33 lb ai acifluorfen + 2.67 lb ai bentazon) — 1.5 pt in 20 gal or more water by ground or 5 gal or more water by aerial equipment with either 0.25% (v/v) nonionic surfactant or 1 qt crop oil concentrate for ground applications or 1 pt crop oil concentrate for aerial applications.	To small, actively growing weeds. **See table below.**	Annual broadleaf weeds. **See table below.**	**Do not** (1) apply more than 1.5 pints per application; (2) exceed 3 pints per season; (3) apply by air if sensitive crops, such as cotton or ornamentals are less than 200 feet down wind; (4) apply sequential treatments of Storm or Ultra Blazer less than 15 days after the initial treatments; (5) use treated plants for food or forage; (6) apply within 50 days before harvest.

Weeds Controlled by Storm

Weeds controlled	**Weed height (in.)**	**Leaf stage (no.)**
carpetweed	2	3-in diam.
cocklebur, crotalaria, jimsonweed, Pennsylvania smartweed	6	6
giant ragweed	6	4
pigweeds, common ragweed	3	6
annual morningglories	2	4
prickly sida	2	4

bentazon at 0.75 to 1.0 lb, or at 0.75 to 1.0 lb + 0.03 lb 2,4-DB	Basagran — 1.5 to 2 pt in 5 to 10 gal of water by air or in 20 gal of water by ground. Add 2 oz **of a 2 lb/gal formulation of 2,4-DB** + 1.5 to 2 pt **Basagran** in 20 gal water and apply with ground equipment.	Early post-emergence[1].	Cocklebur and 2- to 3-inch prickly sida and smartweed. 2,4-DB mix will improve morningglory control.	May be applied as over-the-top sprays using at least two nozzles/row semidirected on a band wide enough to obtain maximum cocklebur plant coverage. **Do not apply more than a total of 4 pints per acre in one season,** within 65 days of harvest (60 days for the 2,4-DB mix), under drought stress conditions or if soybean fields are flooded. Injury may result when applying Basagran and surfactant to soybeans less than 6 inches tall. The 2,4-DB mix will cause soybean foliage injury and may reduce yields. **Do not** add surfactant to the 2,4-DB mix.

[1]For added control of pigweeds and morningglory, 1 pint of **Ultra Blazer** + surfactant may be added to **Basagran** or 0.5 to 1 pint + surfactant for hemp sesbania.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
chlorimuron at 0.0078 to 0.0104 to 0.0117 lb	Classic 25DF — 0.5 to 0.67 to 0.75 oz. **See table below.** Add 0.25% (v/v) of a **nonionic surfactant** in 10 to 20 gal water by ground equipment or in 3 or more gal water by aerial equipment.	To actively growing weeds **(See table below)** after soybeans have one trifoliolate leaf until 60 days before maturity. A second application may be applied 14 to 21 days later if needed, but **do not exceed a total of 1.5 oz Classic per season.**	**See table below.** For entireleaf and ivyleaf morningglory, giant ragweed, and sicklepod, make two applications 14 days apart for optimum control.	**Do not use** on soybeans grown on Black Belt soils having a pH greater than 7.0 or a history of iron chlorosis. Soybeans may be stunted, particularly from the two sequential applications. Very susceptible weeds such as cocklebur and pigweeds will turn yellow in 3 to 5 days, growth stops and they die within 7 to 21 days. Other weeds will remain green but stunted. Cultivation 7 to 14 days **after treatment** will improve control. **Do not** (1) apply if rainfall is expected within 4 hours; (2) graze treated fields or harvest for forage or hay. **Avoid drift** to nontarget species or areas. **Clean sprayer** according to label directions before using to spray other crops.

	Classic		
Target Weeds	**1/2 oz**	**2/3 oz**	**3/4 oz**
	(maximum height, inches at application)		
Cocklebur	6	8	12
Hemp sesbania	4	5	6
Morninglories[1]	2	3	4
Sicklepod	2	3	4
Smartweeds			
ladysthumb	2	3	4
Pennsylvania	2	3	4
Ragweeds			
common	2	3	4
giant	-	-	6
Pigweeds	3	3	4
Wild poinsettia	-	2	4

[1]1 to 2 oz 2,4-DB may be added per label for improved control.

chlorimuron + thifensulfuron at 0.0066 to 0.02 lb **FOR USE ON STS/ROUNDUP READY CULTIVARS ONLY**	Synchrony XP 28.4DG — 0.375 to 1.125 oz in 10 to 20 gal water by ground or 5 gal by air. Add 1% crop oil concentrate or 0.25% nonionic surfactant if applied without a glyphosate formulation not preloaded with a surfactant.	Apply to 1- to 4-inch weeds that are actively growing. Apply to soybean any time before soybean emergence up to 60 days before soybean harvest.	Controls many broadleaf weeds including hemp sesbania, morningglory, yellow nutsedge, small pigweeds, and small sicklepod.	Apply only to STS/Roundup Ready Varieties. The 1- to 1.125-ounce rates provide some residual control of certain small-seeded broadleaf weeds.
clethodim at 0.0938 to 0.125 lb	Clethodim — 6 to 8 oz. **See table below.** Apply in 10 to 30 gal water by ground equipment or a minimum of 3 gal water by air. Always add 1 qt crop oil concentrate.	Apply to actively growing grasses. **See table below.**	Most annual grasses, johnsongrass, and bermudagrass.	Apply over-the-top or as a semi-directed spray to cover grasses. **Do not apply** (1) more than 32 ounces per acre per season, (2) if rainfall is expected within 1 hour, or (3) to stressed plants. See Clethodim label for sequential and tank mix instructions with broadleaf herbicides.

Grass	**Grass height (inches)**	**Clethodim rate (oz)**
Seedling johnsongrass	4-10	6
Volunteer corn	4-18	8
Red rice	1-3	6
Other annual grasses	2-6	6
Rhizome johnsongrass	12-24	8
Repeat treatment	6-10	6
Bermudagrass	3	8
Repeat treatment	3	8

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
cloransulam at 0.25 oz	FirstRate — 0.3 oz in 10 to 20 gal water with 1.2% crop oil concentrate or 0.25% nonionic surfactant.	To actively growing weeds with no more than 2 to 8 leaves, depending on species.	Common cocklebur, morningglory species, ragweed, sicklepod	**Do not** (1) apply through irrigation system; (2) make more than two applications per season.
flumetsulam at 0.1 oz	Python 80WDG — 0.125 oz in 10 to 20 gal water by ground or 5 gal by air. Add 1% crop oil concentrate or 0.25% nonionic surfactant if applied in the absence of a glyphosate formulation not preloaded with a surfactant.	Apply when soybean is in 1–5 trifoliate growth stage. Do not apply to soybean with more than 5 trifoliate leaves.	Prickly sida no more than 2 inches tall.	The addition of 0.25% nonionic surfactant when applied with a glyphosate formulation preloaded with an adjuvant has shown to improve weed control. Do not apply more than two applications postemergence to soybean, and applications must be separated by at least 14 days. If Python is applied preemergence and postemergence, the cumulative rate cannot exceed 0.11 ounce of flumetsulam per acre per season.
fomesafen at 0.25 to 0.375/0.24 to 0.35 lb	Fomesafen — 1 to 1.5 pt. **See table below.** Add 0.25% (v/v) 80% active nonionic surfactant in 10 to 20 gal water by ground equipment.	To actively growing weeds.	**See table below.**	May cause temporary soybean leaf bronzing, crinkling, and/or spotting. Apply in front of cultivator plows if applying in conjunction with cultivation. Rainfall received within 4 hours of application may reduce control. **Do not** (1) apply more than 1.5 pints per acre per growing season; (2) apply to drought-stressed weeds or soybeans under stress from drought, hail damage or other types of injury; or (3) graze treated areas (to include rotational crops) or harvest for forage or hay. **Avoid** conditions conducive to drift to nontarget species or areas.

Fomesafen

Target weed[1]	1.0 pt	1.5 pt
	(maximum no. leaves)	
Cocklebur, eclipta, giant ragweed, smallflower and palmleaf morningglory, hophornbeam copperleaf	-	4
Showy crotalaria, cypressvine morningglory, pigweeds, common ragweed, Palmer amaranth	4	6
Mexicanweed, smellmelon, spiny amaranth	-	2
Entireleaf and ivyleaf morningglory, wild poinsettia	-	3
Purple and pitted morningglory, ladysthumb	2	4
Pennsylvania smartweed	4	4
Hemp sesbania	6	12

[1]**Cocklebur not controlled** if treated at cotyledonary stage.

Crop, weed, or situation and active chemical per treated land acre	**Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)**	**Time of application**	**Weeds controlled**	**Special instructions and remarks**
S-metolachlor at 0.9375 to 1.5 lb	Dual Magnum — 1 to 1.33 pt in 10 to 20 gallons of water by ground equipment.	Soybean emergence to V3.	Annual grasses and pigweed.	Dual Magnum should be applied postemergence to soybean but before weed seedling emergence. It may be tank-mixed with glyphosate in Roundup Ready soybean and with Liberty in LibertyLink soybean. Do not apply more than 1.33 pints per season as a postemergence treatment.
S-metolachlor + fomesafen at 1.09 + 0.24 lb	Prefix 5.29EC — 2 pt in 10 or more gal by ground or 3 to 5 gal by air.	Apply when soybean is in 1–3 trifoliate growth stage.	Controls annual and broadleaf weeds. Good on morningglory, pigweed, hemp sesbania, and Pennsylvania smartweed.	Weed size and rate applied can significantly affect weed control. Application should be made to weeds no larger than 3- to 4-leaf growth stage for most weeds. Injury can occur if soybean is stressed or if rain falls soon after application when soybean plants are very small. Prefix can be tank-mixed with preloaded glyphosate that contains an adjuvant. If it is tank-mixed with glyphosate not containing an adjuvant, be sure to add 0.25% v/v nonionic surfactant. Do not add crop oil concentrate, as severe soybean injury can occur.
fluazifop-P at 0.0938 to 0.25 lb	Fusilade DX 2E — 6 to 8 to 12 to 16 oz. **See table below.** Apply in a minimum of 5 gal water. Always add a crop oil concentrate at 1% or a nonionic surfactant at 0.25% (v/v). Oil concentrates should contain 15 to 20% surfactant. Surfactants should be nonionic and contain at least 75% surface active agent.	Apply to actively growing grasses. **See table below.**	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, volunteer grain sorghum, and red rice.	Apply over-the-top or as a semi-directed spray to cover the grasses. **Do not apply** (1) more than 32 ounces per acre per season, (2) after first bloom, or (3) if rainfall is expected within 1 hour after application. See Fusilade DX label for sequential and tank mix applications.
imazaquin at 0.0625 or 0.125 lb	Scepter 70DG — 1.43 to 2.86 oz in at least 20 gal water by ground equipment and add 0.25% (v/v) nonionic surfactant or crop oil concentrate according to label.	To actively growing weeds up to 12 inches in height, depending on target species.	The lower rate is recommended for cocklebur up to 9 leaves. Use the higher rate on cocklebur and pigweeds up to 12 inches tall, wild poinsettia, and sicklepod.	For effective **sicklepod** control with Scepter, first apply Scepter as a PPI or PRE treatment, then apply the POST treatment before weeds exceed the 1 to 2 true leaf growth stage. Apply the POST treatment at least 90 days before soybean harvest. **Do not** (1) apply more than 0.25 pound of active ingredient per acre of Scepter per growing season, (2) tank mix Scepter with postemergence grass herbicides, (3) graze or feed treated soybean forage, hay or straw to livestock. Only rotational crops harvested at maturity may be used for feed or food. **Avoid drift** to nontarget species or areas.

Grass	**Growth stage (inches)**	**Fusilade DX (oz)**
Volunteer grain sorghum	6 to 12	6
Goosegrass and volunteer cereals	2 to 4	8
Johnsongrass (seedling)	2 to 8	6
Other annual grasses	1 to 4	12
Red rice	0.5 to 1	16
Rhizome johnsongrass	8 to 18	12
regrowth	6 to 12	8
Bermudagrass	4 to 8 stolons	12
regrowth	4 to 8 stolons	8

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
lactofen at 0.2 lb	Cobra 2E — 12.5 oz **plus** 0.125% (v/v) nonionic surfactant (at least an 80% ai), or 0.5 to 1 pt petroleum-based crop oil concentrate (COC) in 20 to 30 gal water by ground equipment. Aircraft: Apply in a minimum of 5 gal water plus 1 qt COC.	After weeds emerge but preferably before soybeans exceed three trifoliolate leaves. One trifoliolate leaf in narrow-row (less than 20 inches) plantings.	**See table below.**	Apply over-the-top or as a directed spray to cover the weeds at the sizes listed in the table below. Temporary leaf speckling, burn, and/or crinkling of soybean leaves present at time of application will occur. **Do not** (1) cultivate 5 days prior to application or while spraying; (2) apply more than once per growing season not later than 90 days before harvest; (3) apply when conditions do not promote active growth of weeds and soybeans; or (4) graze or feed forage, hay, or straw from treated fields. **Avoid drift to nontarget areas.**

	Cobra 2E
Target weed(s)	**0.78 pt (12.5 oz)**
	(max. no. leaves at application)
Common purslane	8-inch (diameter)
Hemp sesbania, common ragweed, pigweeds, cocklebur	6
Showy crotalaria, giant ragweed	4
Morninglories	
palmleaf*	4
pitted*, smallflower, purple*	4
entireleaf*	2
ivyleaf*	2
Prickly sida	4
Spurge, spotted, wild poinsettia	4
Spurge, prostrate	1-inch (diameter)

* Use 1 pt/A crop oil concentrate with ground application

sethoxydim at 0.1875 to 0.2813 to 0.375 lb	Poast Plus 1.0E — 24 to 36 to 48 oz. Apply in 5 to 10 gal water by air or 5 to 20 gal water by ground. add 1 qt crop oil concentrate for aerial and ground applications. **See table below.**	Apply to actively growing grasses.	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, and red rice.	Soybeans at all stages of growth are tolerant to sethoxydim. Apply over-the-top of soybeans or as a semi-directed spray to the grasses. **Do not apply** (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after application; (3) within 90 days of harvest; (4) more than a total of 7.5 pints per acre of Poast Plus in one season. Basagran at the labeled use rate according to weed growth stage may be applied as a tank mix with Poast Plus but the above Poast Plus rates must be increased 50%. **Do not** (1) tank mix with Basagran when applying Poast Plus to control johnsongrass, bermudagrass, and red rice; (2) tank mix with pesticides, additives or fertilizer except as specified on the label.

Grass	Growth Stage (inches)	Poast Plus (oz)
Goosegrass and Crabgrass	up to 6	24
Other annual grasses and seedling johnsongrass	up to 8	24
Rhizome johnsongrass	15 to 20	24
regrowth	6 to 10	24
Bermudagrass	stolons up to 6	36
regrowth	stolons 1 to 4	24
Red rice	up to 4	48

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
quizalofop-P at 0.0344 to 0.0688 lb	Assure II 0.88EC — 5,7,8,9, or 10 oz. Add 0.25% (v/v) of an 80% active nonionic surfactant or 1% (v/v) of a petroleum oil base crop oil concentrate containing at least 15% emulsifier/surfactant in 10 to 20 gal water by ground or 0.5% (v/v) crop oil concentrate in 3 to 5 gal water by aerial equipment. **See table below.**	To actively growing before soybean pod set, and/or 80 days before soybean harvest.	**See table below.**	Apply over-the-top or as a semi-directed spray to cover the grasses. **Do not apply** (1) with crop origin crop oil concentrates; (2) more than 1.25 pints (20 ounces) per season; (3) to drought-stressed grasses; or (4) if rain is expected within 1 hour after application. **Do not** (1) graze treated fields or harvest for forage or hay; (2) cultivate 7 days before or after application or control may be unsatisfactory; or (3) use tank-mixes with Basagran or Classic for grass control except as specified on the label. **AVOID** conditions conducive to drift to nontarget species or areas.

Target Grasses	Growth Stage (inches)	Assure II or Matador (oz)
Volunteer corn	6-30	5-8
Volunteer grain sorghum	6-12	5
Johnsongrass (seedling)	2-8	
Fall panicum, field sandbur, goosegrass, volunteer wheat	2-6	7
Red rice	1-4	9
Other annual grasses	2-6	8
Johnsongrass (rhizome)	10-24	5*
regrowth	6-10	5*
Bermudagrass	6 (runners)	10
regrowth	6 (runners)	7

* Apply in sequence for effective control. Otherwise apply 10 oz to 10-in. rhizome johnsongrass and follow with 7-oz/A to 6-in. regrowth if needed.

Liberty Link Varieties Only

glufosinate at 0.4 to 0.66 lb	Liberty — 22 to 36 fl oz in at least 15 gal water by ground or 10 gal water by air. Coverage is essential. **DO NOT USE** nozzles and pressures that result in COARSE spray droplets.	Apply to actively growing weeds from the time of crop emergence to just before bloom.	Many summer annual grass and broadleaf species. Excellent control of horseweed and morningglory. Apply to 2- to 3-inch pigweed; level of control may decline as pigweed size increases.	**FOR USE ONLY IN LIBERTY-LINK SOYBEAN CULTIVARS.** Do not apply more than 65 fluid ounces per acre of Liberty to soybean in a single growing season. Sequential applications should be made 10–14 days apart to improve control of larger weeds. A single application use rate can be as high as 36 fluid ounces per acre. Apply when temperatures are warm, as colder weather may reduce activity.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 4 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Roundup-Ready Varieties Only				
glyphosate at 0.75 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	From soybean emergence (cracking) through flowering (R2 growth stage). R2 ends when a pod about 3/16 inch long appears at one of the four uppermost nodes on the main stem with a fully developed trifoliate.	Annual and perennial grass and broadleaf weeds. Glyphosate-resistant weeds are prevalent throughout Mississippi. See Herbicide Resistant Weed section for additional control options.	**FOR USE ONLY IN ROUNDUP-READY SOYBEAN CULTIVARS.** Do not apply more than 2.25 pounds (ae) per acre of glyphosate to soybean in a single growing season. Sequential applications should be made 10–14 days apart to improve control of larger weeds.
glyphosate + s-metolachlor 1.6 to 2.3 lb	Sequence — 2.5 to 3.5 pt in at least 10 gal of water by ground and 5 gal by air. AMS at 8.5 to 15 lb per 100 gal of water is recommended.	From soybean emergence (cracking) through 3rd trifoliate.	Postemergence control of weeds normally controlled by glyphosate. Residual control of small-seeded grasses and broadleaf weeds. Glyphosate-resistant weeds are prevalent throughout Mississippi. See table on pages 23-27 for resistant weed control options.	**FOR USE ONLY IN ROUNDUP-READY SOYBEAN CULTIVARS.** Rainfall is required for residual activation. Do not apply more than 3.5 pints per acre. Expect poor control of large-seeded grasses like browntop millet and Texas panicum.
Directed Sprays/Hooded Sprayers				
2,4-DB at 0.20 lb	2,4-DB — 0.9 pt of a 1.75 lb/gal formulation or 0.8 pt of a 2 lb/gal formulation in 10 to 20 gal water.	Apply to cocklebur plants no more than 3 inches tall. **Do not apply** before soybeans are 8 inches tall.	Cocklebur. Partial control or stunting of small pigweed and morningglory.	Apply once or twice as a semi-directed spray when soybeans are 8 to 12 inches tall with sprays directed to contact no more than the lower one-third of the soybean stems. Precise application is essential to prevent soybean injury. **Do not** apply if soybeans are under drought stress. Avoid spray pressures in excess of 40 psi. **Do not add surfactant to spray mixtures.**
linuron at 0.5 to 1.0 lb	1 to 2 lb 50DG or 1 to 2 pt 4L in 20 gal of water. Add 2 qt nonionic surfactant to each 100 gal spray mix.	Before weeds are 2 inches tall. **Do not** apply before soybeans are 12 inches tall.	Most annual grasses and broadleaf weeds if young and actively growing. Best control if weeds are no taller than 2 inches.	Apply only single application as directed spray at base of crop plants striking the soybean plants no higher than 2-3 inches above the ground. **Do not** exceed 25 psi nozzle pressure or apply under windy conditions. **Do not graze** or feed straw or forage to livestock.

Soybeans, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
linuron + 2,4-DB at 0.5 + 0.20 lb	1 lb 50DG or 1 pt 4L + 0.8 pt of a 2 lb/gal or 0.9 pt of a 1.75 lb/gal 2,4-DB formulation in 20 gal water. Nonionic surfactant at 1 to 2 qt per 100 gal of spray mix may be added but crop injury may be increased.	When soybeans are at least 8 inches tall and before weeds are 2 inches tall.	Most annual grasses, cocklebur, morningglory, hemp sesbania, sicklepod and prickly sida. Spray to wet weed foliage.	Apply as directed spray to contact no more than the lower one-third of the soybean stem. **Do not** exceed 25 psi nozzle pressure or apply under windy conditions. **Do not** apply when soybeans are under drought stress or on soils with less than 1/2% organic matter. A second application may be used if needed but must be made before 60 days of harvest.
metribuzin at 0.25 to 0.50 lb	Metribuzin — 0.5 to 1 pt or 75% DF — 0.33 to 0.67 lb in 10 to 20 gal water. Add 1 qt nonionic surfactant/100 gal spray mix.	After soybeans are at least 8 inches tall (12 inches for Lexone) and before broadleaf weeds are 3 inches tall; before grasses are 1 inch tall. A 2nd application may be applied after 7 days if needed.	Most broadleaf weeds less than 3 inches tall except morningglory. Most annual grasses less than 1 inch tall. For hemp sesbania and prickly sida, use 0.375 to 0.5 lb ai/A.	Apply as a directed spray at the base of the soybean plants spraying no more than the lower 1/4 to 1/3 of the soybean plants. Soybean leaves contacted by the spray will be killed. **Do not** (1) exceed 30 psi nozzle pressure or apply under coditions that favor drift; (2) graze or feed forage; (3) apply to sensitive varieties. Injury may occur if two applications of 0.5 pound of active ingredient per acre are applied in soybean fields subject to flooding.
metribuzin + 2,4-DB at 0.25 to 0.5 + 0.2 lb	Metribuzin — 0.5 to 1 pt or **75% DF** — 0.33 to 0.67 lb + 0.8 pt of a 2 lb/gal or 0.9 pt of a 1.75 lb/gal 2,4-DB formulation. Nonionic surfactant may be added to the mix, but crop injury may increase.	When soybeans are at least 8 inches tall and before broadleaf weeds are 3 inches tall; before grasses are 1 inch tall. A 2nd application may be applied after 7 days if needed.	Same as above for metribuzin plus redroot pigweed, cocklebur, sicklepod, and morningglory up to 3 inches.	Apply as a directed spray at the base of the soybean plants spraying no more than the lower 1/4 to 1/3 of the soybean plants. Soybean leaves contacted by the spray will be killed. Keep spray pressure below 30 psi to prevent "fogging" of spray solution. **Do not apply** under conditions that favor drift or to sensitive varieties. **Do not** graze or feed forage. Injury may occur if two applications of 0.5 pound of active ingredient per acre are made to soybean fields subject to flooding.
paraquat at 0.07 to 0.13 lb	Paraquat — 4.5 to 8 fl oz in a minimum of 10 gal water by ground. Add nonionic surfactant according to label directions.	When soybeans are at least 8 inches tall and before grasses are 4 inches tall and pigweed is 3 inches tall.	Most grasses from seed, pigweeds, purslane.	Use low rate for weeds less than 2 inches in height and the higher rate for weeds greater than 2 inches. Soybeans less than 8 inches will be injured or killed. Adjust nozzles to spray the lower 3 inches of the soybean plants. **Do not** exceed 30 psi to avoid driftand minimize foliage burn (spotting). **Do not** apply more than twice. The second application should follow the first by 7 to 14 days.
Midseason Cocklebur Control				
2,4-DB at 0.20 lb	2,4-DB — 0.8 pt of a 2 lb/gal formulation or 0.9 pt of a 1.75 lb/gal formulation in 10 to 20 gal water.	7 to 10 days before soybean bloom until mid-bloom.	Cocklebur.	Apply as broadcast overhead spray after cocklebur plants have elongated and are as tall as soybean plants. 2,4-DB usually causes soybean injury but injury symptoms (pronounced stem curvature, drooping leaves) generally disappear within one week after treatment. Injury is usually more severe if 2,4-DB is applied to soybeans thinly infested with cockleburs. **Do not apply** to drought-stressed soybeans. **Do not add surfactant to spray mixtures.**

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Spot Spraying				
clethodim	Clethodim — 0.25% in water by volume plus 1% crop oil concentrate. (Example — 1 pt Clethodim + 4 pt crop oil concentrate per 50 gal water.)	To actively growing foliage.	Johnsongrass, bermudagrass, and annual grasses.	Spray to wet foliage but not to point of runoff.
fluazifop-P	Fusilade DX 2E — 0.5% + 0.25% surfactant or 1% crop oil concentrate by volume. (Example — 1 qt Fusilade + 1 pt surfactant or 4 pt paraffinic/vegetable crop oil concentrate per 50 gal water).	Apply to all actively growing foliage of 12- to 18-inch johnsongrass.	Johnsongrass, bermudagrass, and emerged annual grasses.	Wet foliage thoroughly, but not to point of runoff. Make the last application before soybean bloom. Use paraffinic/vegetable crop oil concentrates that contain 15-20% surfactant. If a surfactant is used in lieu of the crop oil concentrate, use only nonionic surfactants that contain at least 75% surface active agent.
quizalofop-P	Assure II 0.88EC — 0.375% plus 0.25% nonionic surfactant or 1% petroleum oil base crop oil concentrate in water by volume (Example — 1.5 pt Assure II + 1 pt surfactant or 4 pt crop oil concentrate in 50 gal water).	To actively growing foliage of 10-16-inch johnsongrass or 6-inch bermudagrass runners, but before soybean pod set and/or within 80 days of soybean harvest.	Johnsongrass, bermudagrass, and other emerged annual grass species.	Spray to cover and wet foliage, but not to point of runoff. Use 80% active nonionic surfactants or paraffinic oil base crop oil concentrate with at least 15% emulsifier/surfactant.
sethoxydim	Poast Plus 1.0E — 1.5% + 1.0% crop oil concentrate by volume (Example — Use 6 pt Poast Plus + 4 pt crop oil concentrate per 50 gal of water).	Apply to all actively grow ing foliage of 15-inch johnsongrass.	Johnsongrass, bermudagrass, and emerged annual grasses	Spray to wet foliage thoroughly, but not to point of runoff. **Do not** apply within 90 days of harvest.
glyphosate	glyphosate — 1% (4 pt of a 3 lb ae/gal formulation in 50 gal water) for annual weeds, or a 2% (8 pt of a 3 lb ae/gal formulation in 50 gal water) solution for perennial weeds.	Anytime after johnsongrass reaches 12 inches in height but before soybean pods set.	Johnsongrass, bermudagrass, and most other emerged annual and perennial weeds.	Use high rate mix for bermudagrass. Spray to wet foliage of johnsongrass stems or other undersirable vegetation. Non-Roundup Ready soybeans in the treated area will be killed. Keep drift to a minimum. **Do not** apply if soybeans are setting pods.
Rope Wick				
glyphosate at 25%	glyphosate **— 1 gal of a 3 lb ae/gal formulation plus 3 gal water.** Actual quantity used per acre will vary depending on density of weeds.	Apply when johnsongrass is at least 18 inches tall and 8 inches taller than crop plants.	Johnsongrass from rhizomes and seed.	Position wick bar equipped with polyester-over-acrylic rope 2 to 4 inches above crop plants to contact weed foliage with the herbicide-laden rope. Repeat application as needed to control johnsongrass that later grows above crop canopy. Treatments may be applied in conjunction with tillage of crop. Use speed of 5 mph. Crop will be injured if the herbicide comes in contact with the foliage. **Do not** add crop oil concentrate.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preharvest				
carfentrazone-ethyl at 0.016 to 0.023 lb	Aim — 1 to 1.5 oz in at least 10 gal of water by ground and 5 gal by air. Add 1 qt of nonionic surfactant or 1 to 2 gal of a crop oil concentrate per 100 gal of water.	As a harvest aid when soybeans are mature and fully developed with 50% natural defoliation and the remaining leaves are yellow.	Morningglory desiccation.	Do not apply more than 1.5 ounces per acre per season. Do not apply within 3 days of harvest. Aim may be tank-mixed with glyphosate to improve control of grasses and other weeds.
glyphosate at 0.75 to 3.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preharvest but after all pods have lost all green color.	Most annual grasses, johnsongrass, and some broadleaf weeds. Use rates above 1.5 lb ae would be beneficial for perennial weed control.	Do not apply more than 3.5 pounds (ae) per acre for preharvest applications. Do not apply more than 1.5 pounds (ae) of glyphosate per acre by air. Allow a minimum of 7 days between application and harvest.
paraquat at 0.125 to 0.25 lb	Paraquat — 8 to 16 oz in at least 10 gal water by ground or in at least 5 gal water by air. Add 1 qt nonionic surfactant per 100 gal spray.	As a harvest aid when soybeans are mature — beans are fully developed with at least ½ of leaves dropped and remaining leaves turning yellow.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** apply within 15 days of harvest. **Do not** pasture livestock within 15 days of treatment and remove livestock from treated fields within 30 days before slaughter. **Interval between application and soybean harvest is a minimum of 15 days.**
paraquat at 0.25 lb + sodium chlorate at 3 lb	Paraquat — 8 to 16 oz plus 2 qt sodium chlorate (6 lb/gal) in at least 10 gal water or in 5 gal water by air. Add 1 qt nonionic surfactant per 100 gal spray.	As a harvest aid when soybeans are mature — beans are fully developed with at least one-half of leaves dropped and remaining leaves turning yellow.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** apply within 15 days of harvest. **Do not** graze treated fields or feed treated bean foliage and fodder. **Interval between application and soybean harvest is a minimum of 15 days.**
saflufenacil at 0.022 to 0.044 lb	Sharpen — 1 to 2 fl oz in at least 10 gal water by ground or 5 gal water by air. Coverage is essential. Use of a MSO plus AMS is recommended for optimum desiccation.	Apply as a harvest aid to soybeans that have reached physiological maturity.	Foliage of most broadleaf weeds that receive good spray coverage will be dessicated.	Apply to indeterminant varieties with at least 65% brown pods and 70% defoliation or when seed moisture is 30% or less. Apply to determinant varieties when seed are fully developed with greater than 50% defoliation and remaining leaves are yellowing. Do not apply more than 2 fluid ounces per acre as a harvest aid per cropping season. Do not apply within 3 days of harvest.
sodium chlorate at 6 lb	2 qt of a 6 lb/gal or 1 gal of a 3 lb/gal formulation in 20 to 40 gal water by ground or in 7 to 10 gal water by air.	Apply as a harvest aid to soybeans ready to harvest; but 7 to 10 days before harvest.	Foliage of most weeds that receive good spray coverage will be desiccated.	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** graze treated fields or feed treated bean foliage and fodder.

CORN

ESTIMATED LEVELS OF WEED CONTROL NORMALLY EXPECTED[1]

Herbicides	Barnyardgrass	Crabgrass	Broadleaf signalgrass	Fall panicum	Goosegrass[2]	Johnsongrass rhizome	Johnsongrass seedling	Italian Ryegrass[3]	Annual sedge	Purple nutsedge	Cocklebur	Horseweed[4]	Lambsquarter	Morningglory	Hemp sesbania	Pigweed, smooth, redroot	Palmer, spiny amaranth, tall waterhemp[5]	Prickly sida (teaweed)	Sicklepod
Preplant																			
Clarity	1	1	1	1	1	0	0	0	3	1	**9**	*	**9**	**9**	**9**	**8**	**8**	**8**	**8**
Glyphosate	**9**	**9**	**9**	**9**	**8**	4	**9**	6	**9**	7	**8**	**9**	**9**	7	6	**9**	**9**	**7**	**8**
2,4-D	2	0	0	2	1	0	0	0	4	2	**8**	**8**	**9**	**9**	**8**	**8**	**8**	**8**	**8**
Paraquat	**8**	**8**	**8**	**8**	**8**	3	**8**	7	**9**	0	**9**	5	**9**	6	6	**9**	**9**	6	**8**
Preemergence																			
Atrazine	6	7	5	4	6	0	4	*	4	2	**9**	*	**9**	**8**	7	**9**	**9**	**8**	**8**
Bicep II Magnum,																			
Guardsman Max, Harness																			
Xtra, or Fultime	**8**	**9**	**8**	**8**	**9**	0	**8**	**8**	7	3	**8**	*	**9**	**8**	6	**9**	**9**	**8**	6
Dual II Magnum,																			
Outlook, Harness, or Surpass	**8**	**9**	7	**9**	**9**	4	6	**8**	**8**	3	0	*	6	0	2	**9**	**8**	4	5
Lexar	**9**	**9**	**8**	**9**	**9**	2	**8**	7	**8**	7	**10**	**8**	**9**	**9**	**8**	**9**	**9**	**9**	**8**
Pendimethalin	**8**	**8**	6	**8**	**8**	4	7	5	0	0	**8**	0	*	6	0	**8**	7	0	0
Sharpen	1	1	1	1	1	*	1	1	*	*	6	**8**	7	6	6	**9**	**9**	7	5
Simazine	6	**8**	5	6	7	0	4	*	2	0	**9**	3	**9**	7	*	**9**	**9**	**9**	**8**
Verdict	**8**	**8**	6	*	**8**	*	*	*	*	*	6	**8**	7	6	6	**9**	**9**	7	5
Zidua	**9**	**9**	**8**	**8**	**9**	4	6	**9**	*	*	*	6	4	7	3	**9**	**9**	7	*
Postemergence Over-the-top																			
Accent[6]	**8**	5	**8**	7	*	**8**	**9**	6	3	*	5	*	5	6	7	**8**	6	4	5
Atrazine + Surfactant	5	7	6	4	5	0	3	*	6	2	**9**	*	**8**	**8**	6	**8**	7	**8**	7
Atrazine + oil	6	**8**	7	5	6	0	3	*	6	2	**9**	*	**9**	**8**	7	**9**	**9**	**9**	**8**
Atrazine + Dual II Magnum[7]	6	6	5	4	6	0	4	*	5	2	**8**	*	**8**	**8**	6	**8**	**8**	7	**8**
Basagran	0	0	0	0	1	0	0	0	6	2	**9**	*	0	3	4	3	3	**8**	1
Callisto	7	**9**	7	7	*	0	0	*	*	*	**8**	*	**9**	**9**	*	**9**	**9**	**9**	5
Capreno	**8**	**8**	**8**	*	*	5	7	*	*	*	**8**	*	**9**	**8**	*	**9**	**9**	7	7
Clarity	1	1	1	1	1	0	0	0	3	1	**9**	**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**
Clarity + 2,4-D	1	1	1	0	1	0	0	0	3	1	**9**	**8**	**8**	**8**	**8**	**8**	**8**	7	7
2,4-D	1	0	0	2	1	0	0	0	4	2	**8**	**8**	**9**	**9**	**8**	**8**	**8**	**8**	**8**
Glyphosate (RR only)	**9**	**9**	**9**	**9**	**9**	7	**9**	6	**9**	7	**8**	**9**	**9**	7	6	**9**	**9**	7	**8**
Halex GT (RR only)	**9**	**9**	**9**	**9**	**9**	**9**	**9**	6	**8**	**8**	**10**	7	**8**	**8**	**8**	**9**	**9**	**9**	**9**
Laudis	7	**8**	**8**	*	7	5	6	*	*	*	**8**	*	**9**	**8**	*	**9**	**9**	7	7
Lexar	7	**9**	**9**	**8**	**9**	2	**8**	7	**8**	7	**10**	**8**	**9**	**9**	**8**	**9**	**9**	**9**	**8**
Liberty 280 (LLink only)	**8**	**9**	**8**	**9**	5	7	**8**	6	**8**	4	**9**	**8**	*	**9**	**9**	**8**	**8**	**9**	**9**
Permit	2	2	2	2	2	1	2	*	**9**	**8**	**9**	5	5	6	**8**	**8**	6	7	5
Postemergence - Directed																			
Evik	**9**	**9**	**9**	**8**	**8**	0	**8**	*	*	3	4	*	*	5	1	**8**	**8**	4	**8**
Linex/Lorox	**9**	**8**	**8**	**8**	7	0	6	*	5	2	7	*	**9**	**8**	**8**	**8**	**8**	**8**	**8**
Paraquat	**8**	**8**	**8**	**8**	**8**	3	**8**	7	**9**	0	7	5	**9**	6	6	**9**	**9**	6	**8**
Preharvest																			
2,4-D	0	0	0	2	1	0	0	0	4	2	**9**	*	**9**	**9**	**9**	**9**	**9**	**8**	**8**
Glyphosate	**8**	**9**	**9**	**9**	**8**	**8**	**9**	**9**	**9**	7	**9**	**8**	**9**	**8**	6	**9**	**9**	**8**	**9**
Aim	1	0	0	0	0	0	0	0	0	0	6	*	7	**8**	**8**	**8**	**8**	*	0

[1]Rating scale: 0-3, none to slight; 4-6, fair; 7-8, good; 9-10, excellent. Ratings assume the herbicides are applied in the manner suggested in the guidelines and according to the label under optimum growing conditions.

[2]Goosegrass resistance to Group 9 (glyphosate) herbicides has been identified in Mississippi.

[3]Italian ryegrass resistance to Group 2 (Accent, Resolve Q, and Steadfast) and Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[4]Horseweed resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi.

[5]Palmer amaranth, spiny amaranth, and tall waterhemp resistance to Group 9 (glyphosate) herbicides is prevalent across Mississippi. Palmer amaranth resistance to Group 2 (Accent, Resolve Q, Steadfast, and Permit) herbicides is also common.

[6]Resistance to ALS or Group 2 (Accent, Resolve Q, Steadfast) herbicides has been documented in several weed species in Mississippi. Control of weeds with ALS resistance will be reduced with Accent, Resolve Q, and Steadfast. Please see Herbicide-resistant Weeds section for a list of herbicide-resistant weeds.

[7]Tank mix rating not premix.

*Data not available

See vegetable section for sweet corn recommendations.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ROTATIONAL CROP RESTRICTIONS

Corn herbicides	Rotation interval[1]						
	Corn	Cotton	Grain sorghum	Rice	Soybeans	Wheat	Other grains
2,4-D	none	28 d	7 d	21 d	15 d	7 d	none
Accent	none	10 m	10/18 m[2]	10/18 m[3]	15 d	4 m	4 m[4]
Atrazine[5]	none	ns	none	2 yr	ns[6]	1 y	1 y[7]
Basagran	none	none	none	none	none	none	none
Bicep II Magnum[5]	none	ns	none[8]	15 m	ns	15 m	15 m
Callisto	none	10 m	none	18 m	10 m	4 m	4 m
Capreno	none	10 m	10 m[9]	18 m	10 m	4 m	18 m
Clarity[10]	none	none	none	none	none	none	none
Diuron							
PRE, banded	none	none	none	4 m	4 m	4 m	4 m
PRE, broadcast	none	none	none	6 m	6 m	6 m	6 m
POE	none	none	none	1 y	1 y	1 y	1 y
Dual II Magnum	ns	none	none	spring	none	4.5 m	4.5 m
Evik	ns	11 m	11 m	11 m	11 m	3 m	3 m
Fultime	none	2 y	spring	2 y	spring	15 m	2 y
Glyphosate	11 m	none	none	none	none	none	none
Guardsman Max	11 m	ns	ns	2 y	ns[6]	1 y	1 y[7]
Halex GT	none	10 m	none	18 m	10 m	4 m	4 m
Harmony Extra	14 d	14 d	14 d	none	14 d	none	60 d[11]
Harness	none	ns	ns	2 y	ns	4 m	ns
Harness Xtra	none	ns	ns	2 y	ns	ns	2 y
Laudis	none	10 m	10 m	18 m	8 m	18 m	18 m
Lexar	none	spring	spring	18 m	spring	spring	spring
Liberty 280	none	none	6 m	none	none	70 d	70 d
Lorox	none	4 m	4 m	4 m	4 m	4 m	4 m[12]
Marksman[5]	none	ns	none	ns	ns[6]	10 m	10 m
Outlook	none	ns	ns	ns	none	4 m	4 m
Paraquat	none	none	none	none	none	none	none
Pendimethalin	1 m	10 m	10 m	none	none	4 m	ns[13, 14]
Permit	none	4 m	2 m	2 m	9 m	2 m	2 m
Sharpen	none	4 m	none	15 d	3 m	none	none
Surpass	none	2 y	spring	2 y	spring	4 m	2 y
Verdict	none	ns	ns	ns	ns	4 m	4 m
Zidua	none	none	6 m	none	none	70 d	70 d

[1]d,m,y, spring, fall, and ns indicate days after application, months after application, years after application, spring following application, fall following application, and next season, respectively. PRE and POE indicate preemergence and postemergence applications, respectively.

[2]Grain sorghum may be planted 10 months after Accent application on soils with pH 7.5 or less. If soil pH is greater than 7.5, do not plant grain sorghum less than 28 months after application.

[3]Rice may be planted 10 months after Accent application on soils with pH 6.5 or less. If soil pH is greater than 6.5, do not plant rice less than 18 months after application.

[4]Winter wheat and barley may be planted 4 months after Accent application. Oats may be planted 8 months after Accent application.

[5]If applied after June 10, do not rotate to any crop other than corn or grain sorghum the year following application, or injury may occur.

[6]Injury may occur to soybeans planted in soils with a calcareous surface layer.

[7]Do not plant spring-seeded small grains the year following application or injury may occur.

[8]Replant only with Concept-treated or Screen-treated seed.

[9]Increase rotational interval for grain sorghum to 18 months if pH is 7.5 or greater or if Capreno rate exceeded 3 ounces per acre.

[10]No rotation interval exists if the treated crop was harvested normally.

[11]Barley or oats may be replanted immediately. Other grains require 60 days before planting.

[12]Only barley, oats, rye, and wheat may be replanted.

[13]Do not plant wheat or barley until next season if rhizome johnsongrass or red rice control or itchgrass suppression rates are applied.

[14]In areas of low moisture (<15 in/yr) and low organic matter (<2%), do not plant soybeans for 18 months after Scorpion III application.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant Foliar				
dicamba at 0.25 lb/A	Clarity — 0.5 pt/A	Preplant for vegetation knockdown.	Broadleaf weeds.	Reduced tillage production systems only.
glyphosate at 0.37 to 1.25 lb/A	See table on pages 5-6 for glyphosate rates.	Preplant for vegetation knockdown.	Horseweed, barnyardgrass, johnsongrass, and other weeds.	Consult label to determine rates for weeds and growth stages and to determine if a surfactant is needed.
paraquat — 0.5 to 1 lb/A	2 lb/gal formulation — 2 to 4 pt/A; 3 lb/gal formulation — 1.33 to 2.67 pt/A	Preplant or preemergence.	Annual and perennial grasses and broadleaf weeds.	Use the lower rates on weeds 1–3 inches tall and the higher rates on weeds 4–6 inches tall. Avoid off-site movement to emerged vegetation. Add nonionic surfactant at 0.5% v/v or crop oil concentrate at 1% v/v.
2,4-D at 0.475 to 0.95 lb/A	3.8 lb/gal — 1 to 2 pt/A or 5.7 lb/gal — 0.67 to 1.3 pt/A	7-14 days before planting.	Broadleaf weeds.	**Do not** use on sandy soils.
Preemergence				
acetochlor at 0.8 to 2.4 lb/A	Harness — 1.25 to 3 pt/A or Surpass EC — 1 to 3 pt/A. **See tables below.**	Up to 30 days before planting, preplant incorporated, preemergence, or after planting but before corn emergence.	Annual grasses, many small-seeded broadleaf weeds, and yellow nutsedge.	Use higher rates on reduced or no-till systems. **Do not** use on sweet corn. **Do not** apply by air or when environmental conditions favor off-target movement. If stand failure occurs, replant corn but do not make a second application of Surpass or Harness.
acetochlor at 0.8 to 2.4 lb/A + atrazine at 0.8 to 1.3 lb/A	Fultime — 1.6 to 3.3 qt/A or Harness Xtra — 1.4 to 3 qt/A. **See tables below.**	At planting or before crop or weed emergence.	Same as above plus other broadleaf weeds controlled by atrazine.	**Do not** apply by air. **Do not** use on sweet corn.

Soil texture	Surpass rate (pt/A)[1]	
	Conventional	Reduced/no-till
coarse	1-2.5	2
medium	1.5-2.5	2-2.5
fine	1.5-2.75	3

[1]Rates given for soils with 3% or less organic matter. Use lower rates for sparse weed populations and higher rates for dense weed populations.

Soil texture	Harness rate (pt/A)[1]	
	Conventional[2]	Reduced/no-till
coarse	1.25-1.75	1.5-2
medium	1.75-2.25	2.25-2.75
fine	1.75-2.25	2.75-3

[1]Use higher rates in areas with dense weed infestation.

[2]Rates for soils with 3% or less organic matter.

Soil texture	Fultime rates (qt/A)[1]		
		Reduced/no-tillage	
	Conventional tillage[2]	14 or more DBP[3]	less than 14 DBP or preemergence
coarse	1.6	do not apply	1.6-2.2
medium	1.6-2.2	2.6-3.3	2.2-2.6
fine	2.2-2.6	3.3	2.6-3.3

[1]Use high rates for dense weed populations.

[2]Rates for soils with 3% or less organic matter.

[3]DBP indicates days before planting.

Soil texture	Harness Xtra rates (qt/A)	
	< 3% Organic matter	≥ 3% Organic matter
coarse	1.4	1.7
medium	1.7-2.4	2.3-2.6
fine	2.3-2.6	2.3-3

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
atrazine at 2 lb/A	4 lb/gal – 2 qt/A or 90 DF – 2.2 lb/A	At planting.	Most small-seeded annual weeds and grasses. Broadleaf signalgrass control poor.	Atrazine is a restricted use pesticide. Do not exceed 2.5 pounds of active ingredient per acre per year. See label for additional restrictions.
atrazine at 1 to 1.3 to 1.6 lb/A + metolachlor at 0.8 to 1 to 1.6 lb/A	Bicep II Magnum or Cinch ATZ — 1.3 to 1.6 to 2.1 qt/A or Dual II Magnum — 1.33 to 1.67 pt/A + 1 to 1.3 to 1.6 qt/A of 4 L atrazine formulation or equivalent rates of other atrazine formulation	At planting.	Most small-seeded annual grasses and broadleaf weeds, including broadleaf signalgrass.	Apply broadcast or on band behind press wheel before corn emerges. See atrazine preemergence for restrictions.
dicamba at 0.25 lb/A	Clarity — 0.5 pt/A	At planting.	Broadleaf weeds.	Apply only to medium- or fine-textured soils that contain 2% or greater organic matter. **Do not** apply to coarse-textured soils after crop emergence.
dimethenamid at 0.6 to 0.8 lb/A	Outlook — 12 to 18 oz/A	At planting.	Most small-seeded annual grasses and broadleaf weeds.	This treatment provides poor control of most large-seeded broadleaf weeds. See label for tank mixtures.
dimethenamid at 0.5 to 0.8 lb/A + atrazine at 1 to 1.7 lb/A	Guardsman Max — 2.5 to 4 pt/A in 2 or more gal water to obtain coverage **Soil texture[1] / Guardsman rate (pt/A)** Coarse: 2.5 - 3 Medium or Fine: 3 - 4 [1]Rates given are for soils with less than 3% organic matter.	At planting.	Many annual grasses, broadleaf weeds, yellow nutsedge, and rice flatsedge.	Soil cation exchange capacity (CEC) value is the preferred method of rate selection. However, soil texture can be used. If used in no-till system with heavy residue, or if soil organic matter content is greater than 3%, increase the application rate by 0.5 pint per acre. **Do not** exceed 4.6 pints per acre per season. Corn may be grazed or fed to livestock 40 or more days after application.
dimethenamid at 0.39 to 0.7 lb/A + saflufenacil at 0.045 to 0.08 lb/A	Verdict — 10 to 18 oz/A	Preplant, preplant incorporated, or preemergence.	Annual grasses and broadleaf weeds.	Use lower rates on coarse soils. Do not apply after corn emerges or severe crop injury will occur. Do not apply where at-planting application of an organophosphate or carbamate insecticide is planned. Do not apply more than 25 ounces per acre per year.
mesotrione + atrazine + S-metolachlor at 0.093 to 0.168 lb/A + 0.72 to 1.31 lb/A + 0.72 to 1.31 lb/A	Lexar — 1.67 to 3 qt/A	Preemergence.	Annual grasses and broadleaf weeds.	**Do not** apply postemergence within 7 days of any organophosphate or carbamate insecticide application. Research indicates that split applications with 2 quarts per acre applied preemergence and 1 quart per acre applied postemergence with glyphosate or Liberty 280 is effective for control of glyphosate-resistant Palmer amaranth.
S-metolachlor at 0.8 to 1.6 lb/A	Dual II Magnum — 1 to 1.67 pt/A	At planting.	Most annual grasses and small-seeded broadleaf weeds. Partial control of seedling johnsongrass.	For soils with 3% or more organic matter, increase rate by 0.5 pint per acre. This treatment provides poor control of most large-seeded broadleaf weeds.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin at 0.75 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.6 to 3.2 pt/A or 3.3 EC formulation — 1.8 to 3.6 pt/A	At planting.	Most small-seeded annual weeds and grasses.	See label for tank mixtures. This treatment provides poor control of broadleaf signalgrass and most large-seeded broadleaf weeds.
pyroxasulfone at 0.08 to 0.21 lb/A	Zidua — 1.5 to 4 oz/A. **See table below.**	Preplant, preplant incorporated, or preemergence.	Annual grasses and small-seeded broadleaf weeds.	Do not apply more than 2.75 ounces per acre per year on coarse soils. Do not apply more than 5 ounces per acre per year on medium or fine soils. **Weed control will be optimized when applications are made to seedbeds free of residue.**
saflufenacil at 0.045 to 0.067 lb/A	Sharpen — 2 to 3 oz/A	Preplant, preplant incorporated, or preemergence.	Broadleaf weeds. **Does not control grasses.**	Use lower rates on coarse soils. Sharpen should be applied in mixtures with Prowl H_2O, Outlook, Harness, or similar products for residual control of annual grasses. **Do not apply** after corn emerges or severe crop injury will occur. **Do not apply** where at-planting application of an organophosphate or carbamate insecticide is planned. **Do not apply** more than 6 ounces per acre per year.
simazine at 2 to 3 lb/A	4 L — 4 to 8 pt/A or 90 DF — 2.2 to 4.4 lb/A	Preplant or preemergence.	Most annual grasses and small-seeded broadleaf weeds.	Till soil in fall to minimize carryover potential to rotational crops.

	Zidua rate (oz/A)		
Soil Texture	**Preplant**	**Preplant incorporated**	**Preemergence**
Coarse	1.50 to 2.75	1.50 to 2.75	1.50 to 2.75
Medium	2.00 to 3.00	2.00 to 3.00	2.00 to 3.00
Fine	2.50 to 4.00	2.50 to 4.00	2.50 to 4.00

Postemergence Over-the-top

atrazine at 2 lb/A + crop oil concentrate	4 L — 4 to 8 pt/A or 90 DF — 2.2 to 4.4 lb/A + 1 qt/A crop oil concentrate	Before weeds reach 1.5 inches tall and before corn exceeds 12 inches.	Annual grasses and broadleaf weeds.	**Atrazine is a restricted-use pesticide.** This treatment may be applied over the top as an early postemergence treatment to corn less than 12 inches tall. **Do not** exceed 2.5 pounds of active ingredient per acre per year. **Do not** apply when corn is under stress from cold or excess rain. Application with insecticides, liquid fertilizers, or other materials is not recommended due to compatibility problems or crop injury.
atrazine at 1 to 1.3 to 1.6 lb/A + metolachlor at 0.8 to 1 to 1.6 lb/A	Bicep II Magnum — 1.3 to 1.6 to 2.1 qt/A or tank mix 1 to 1.33 to 1.67 pt/A Dual II Magnum + 1 to 1.3 to 1.6 qt/A atrazine 4L or equivalent rates of other atrazine formulations	Before weeds and grasses reach 1.5 inches tall and before corn exceeds 12 inches.	Most annual weeds and grasses.	See atrazine comments above.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
bentazon at 0.75 to 1 lb/A	Basagran — 1.5 to 2 pt/A as an over-the-top spray	Apply early post to rapidly growing cocklebur with 2 to 10 leaves.	Cocklebur, small prickly sida, smartweed, and ragweed; suppresses yellow nutsedge.	Use the low rate for small cocklebur and the high rate for 6- to 10-leaf cocklebur. Control may be poor if applied under drought stress. It is useful for controlling cocklebur in areas with 2,4-D-sensitive crops. Rainfall within 8 hours after application may reduce effectiveness. One repeat application may be made.
carfentrazone 0.008 lb/A	Aim — 0.5 oz/A	Apply from 30 days before planting up to 8-leaf collar stage. Weeds should be no larger than 4 inches or 3 inches in diameter if in a rosette.	Morningglories and pigweeds.	For seed production fields, apply post directed only using drop nozzles. Do not apply more than 1.9 ounces per acre of Aim 2EC (0.031 pound of active ingredient per acre) per season. Use a nonioninc surfactant at 0.25% v/v. Under dry conditions, a crop oil concentrate (COC) may improve weed control. The use of COC may increase crop injury.
dicamba at 0.25 to 0.5 lb/A	Clarity — 0.5 to 1 pt/A	Before corn is 36 inches tall or until 15 days before tassels emerge, whichever occurs first.	Most broadleaf weeds.	May be applied overhead. **Do not** apply to sweet corn or popcorn. **Do not** make more than one application per season. Use the high rate before corn reaches 8 inches tall or exceeds the 5-leaf stage. Use the low rate if corn is greater than 8 inches tall.
dicamba at 0.125 to 0.25 lb/A + 2,4-D at 0.25 to 0.50 lb/A	Clarity — 0.25 to 0.5 pt/A + 2,4-D 4 lb/gal — 0.5 to 1 pt/A	See special instructions.	Most broadleaf weeds.	May be applied overhead before corn is 8 inches high. Use drop nozzles to direct spray to lower parts of the corn plant if taller than 8 inches.
For Use Only on Liberty Link Hybrids				
glufosinate at 0.4 lb/A	Liberty 280 — 22 oz/A	From corn emergence to V5 growth stage.	Most annual grasses and broadleaf weeds.	**Do not** apply when wind causes drift to desirable vegetation. **Do not** apply more than two applications per year. Sequential applications should be at least 10–14 days apart. **Do not** exceed 44 ounces per growing season. **Do not** apply within 70 days of harvest. **Do not** add surfactant, and **do not** use nitrogen solutions as spray carriers.
For Use Only on Roundup Ready 2 Hybrids				
glyphosate 0.56 to 0.75 lb/A	See glyphosate table on pages 5-6 for rates.	Apply over the top up to the V8 stage or until corn reaches 30 inches, whichever comes first.	Postemergence control of most annual broadleaf and grass weeds, including johnsongrass.	The use of a residual herbicide in the weed control program is usually necessary to obtain optimum control. Single in-crop applications must not exceed 32 ounces per acre (3ae) or 22 ounces per acre (4.5 ae). Sequential applications may be made, but do not exceed a total of 64 ounces per acre (3 ae) or 44 ounces per acre (4.5ae) per season over the top. Allow a minimum of 10 days between applications. Avoid planting hybrids with little or no tolerance to the stunt virus complex in areas heavily infested with johnsongrass. This treatment may be tank mixed with atrazine (up to 12-inch-tall corn) for residual control. See label for other tank mixes. Avoid spraying under conditions that favor drift. Consult the label for restrictions.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
halosulfuron at 0.032 to 0.063 lb/A	Permit — 0.67 to 1.33 oz/A + 0.25% nonionic surfactant or 1% crop oil concentrate	Anytime between spike and layby, but at least 30 days before harvest.	Nutsedge, cocklebur, and pigweed.	This treatment may be applied with liquid fertilizer, but fertilizer should not be the total carrier because injury may occur. **Do not** make more than two applications per season or exceed 2.67 ounces per acre per season.
mesotrione at 0.094 lb/A + atrazine at 0.5 to 0.75 lb/A	Callisto — 3 oz/A + atrazine 4 L — 1 to 1.5 pt/A	Apply over the top of corn up to 12 inches tall.	Morningglories, cocklebur, pigweeds, and several other broadleaf species.	**Do not apply** to corn treated with soil applications of Counter or Lorsban. **Severe corn injury may occur** if any organophosphate or carbamate insecticide is applied foliar postemergence within 7 days before or after Callisto. Use a crop oil concentrate at 1% v/v. **Do not use** methylated seed oil (MSO) or MSO blend adjuvants as crop injury may occur. Do not exceed two applications per year. **NOTE:** Without atrazine, Callisto may be applied to corn up to 30 inches tall.
mesotrione + atrazine + s-metolachlor at 0.093 to 0.168 lb/A + 0.72 to 1.31 lb/A + 0.72 to 1.31 lb/A	Lexar — 1.67 to 3 qt/A. Add 0.25% nonionic surfactant for postemergence application.	Preemergence or early postemergence until corn is 12 inches tall.	Most broadleaf weeds and annual grasses.	Do not apply postemergence within 7 days of any organophosphate or carbamate insecticide application. It may be tank-mixed with glyphosate or Liberty 280 to improve postemergence control.
mesotrione + glyphosate + s-metolachlor at 0.094 lb/A + 0.94 lb ae/A + 0.94 lb/A	Halex GT — 3.6 pt/A. Add 0.25% nonionic surfactant.	Early postemergence until corn is 12 inches tall.	Most broadleaf weeds and annual grasses.	Do not apply postemergence within 7 days of any organophosphate or carbamate insecticide application. It may be tank-mixed with atrazine to improve broadleaf weed control.
nicosulfuron at 0.5 oz/A	Accent — 0.67 oz/A + 0.25% nonionic surfactant or 1% crop oil concentrate	See special instructions. Apply when corn is in 2- to 6-leaf growth stage.	Johnsongrass and other annual weeds.	Applications at later stages should be made with drop nozzles to rhizome johnsongrass (8 to 18 inches) and to broadleaf signalgrass (1 to 2 inches). Consult the label for additional weeds and growth stages. Split applications may be used, but the combined dosage must not exceed 1.33 ounces of Accent per acre. **Do not apply** when corn or weeds are stressed by drought or other problems. **Do not apply** to corn treated with Counter or soil-applied organophosphate insecticides. **Do not apply** to corn treated with foliar-applied insecticides, such as Lorsban, malathion, and parathion, or with the herbicides Basagran, Laddock, and Tandem. **Do not apply** these pesticides within 3 days after Accent application. (See label for IR corn.) **Consult the label** for restrictions and precautions. **Do not graze** or feed treated forage or grain to livestock within 30 days after application.

Corn, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
nicosulfuron + rimsulfuron at 0.023 + 0.012 lb/A	Steadfast 0.75 oz/A	Apply postemergence to corn that is up to 20 inches tall and exhibiting up to and including 6 leaf collars. In order to optimize control, apply to 1- to 2-inch weeds.	Annual grass and broadleaf weeds.	Applications of Steadfast must include either a crop oil concentrate or a nonionic surfactant. In addition, an ammonium nitrogen fertilizer must be used unless specifically prohibited by tank mix partner labeling. Do not make more than one application of Steadfast per cropping season. **Do not apply** to field corn grown for seed, to popcorn, or to sweet corn. **Do not use Steadfast** in the same year as Counter 15G, Counter 20CR, Dyfonate, Lorsban, and Thimet. **See label** for other insecticide and application restrictions.
tembotrione at 0.082 lb/A + atrazine at 0.5 to 0.75 lb/A	Laudis — 3 oz/A + atrazine 4 L — 1 to 1.5 pt/A. Add 1% methylated seed oil.	From corn emergence until corn is 12 inches tall.	Annual grasses and broadleaf weeds.	It may be tank-mixed with glyphosate or Liberty 280 and atrazine. Do not exceed 6 ounces per acre per growing season. NOTE: Without atrazine, Laudis may be applied up to the eight-leaf collar stage.
tembotrione at 0.067 lb/A + thiencarbazone-methyl at 0.013 lb/A	Capreno — 3 oz/A. Add 1% crop oil concentrate.	From 1- to 6-leaf collar growth stages.	Annual grasses and broadleaf weeds.	It may be tank-mixed with glyphosate or Liberty 280 and atrazine. Do not exceed 6 ounces per acre per growing season.
2,4-D at 0.24 to 0.72 lb/A	2,4-D amine — 0.5 to 1.5 pt/A of 3.8 lb/gal	See special instructions.	Broadleaf weeds.	**Direct spray below whorl of corn plants taller than 8 inches.**
Postemergence - Directed				
ametryn at 0.6 to 1.6 lb/A	Evik — 0.75 to 2 lb/A. Add 0.5% surfactant	After smallest corn is at least 12 inches tall.	Annual grasses and broadleaf weeds, particularly broadleaf signalgrass.	**Use directed spray at base of plants** to avoid as much leaf contact as possible. **Keep sprayer drift out of whorl.** Use 0.75 pound for 2-inch broadleaf signalgrass, 1.25 pounds for 4-inch broadleaf signalgrass, 2 pounds for 6-inch broadleaf signalgrass, and 1.25-2 pounds for other weeds and grasses. **Do not** graze livestock in treated areas or feed forage within 30 days of application. Small grains may be planted in fall following application.
linuron at 0.63 to 1.5 lb/A	50 DF — 1.25 to 3 lb or 4 lb/gal — 1.25 to 3 pt. Add 0.5% surfactant.	When corn is at least 15 inches tall and before weeds are 5 inches tall.	Most annual broadleaf weeds and grasses.	Apply as a directed spray to cover weeds. **Do not** use on loamy sand or sand. May be applied in N solutions. Use the low rate when weeds are less than 2 inches tall and on light soils. Use the high rates on weeds up to 5 inches or on heavy soils.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
For use under hooded sprayers				
paraquat at 0.25 to 0.47 lb/A	2 lb/gal formulation — 1 to 1.88 pt/A; 3 lb/gal formulation — 0.67 to 1.25 pt/A	Apply to 6-inch-tall corn **using hooded sprayer ONLY.**	Annual grasses and broadleaf weeds less than 6 inches tall.	Keep the bottom of the hood in contact with soil surface. Avoid crop contact with spray solution. Avoid use of spray tips that produce fine spray droplets. Include nonionic surfactant at 0.25% v/v. Best results are achieved when tank-mixed with other residual broadleaf herbicides. Consult label for specific tank mixes.
Preharvest				
2,4-D at 0.5 to 1 lb/A	2.4-D amine — 1 to 2 pt/A of 4 lb ai/gal	After corn is in dent or hard dough stage.	Most broadleafs.	Apply to cornfields where broadleaf weeds such as morningglory, cocklebur, and sicklepod make harvesting difficult. Wait 5 to 7 days before harvesting.
carfentrazone at 0.031 lb/A	Aim — 1.9 oz/A + 1% v/v crop oil concentrate	After corn grain is physiologically mature and at least 3 days before grain harvest.	Morninglories, pigweeds, and hemp sesbania.	Spray volume must be sufficient to provide complete coverage of undesired foliage. A minimum of 10 gallons per acre is suggested for ground application and 5 gallons per acre for aerial application.
sodium chlorate at 6 lb/A	Sodium chlorate — 2 gal of 3 lb/gal formulation	After corn is in dent or hard dough stage.	Most grasses.	Apply to cornfield where grasses such as johnsongrass make harvesting difficult. Apply at least 14 days before anticipated harvest date on clear days when temperatures are expected to go above 70 °F. **Do not** graze treated fields or feed fodder, forage, or residual seeds within 14 days of application.
glyphosate at 0.37 to 1.25 lb ae/A	See table on pages 5-6 for glyphosate rates.	After grain reaches 35% moisture or less and kernel black layer has formed, but 7 days before harvest.	Johnsongrass and other annual weeds.	**Do not** exceed 1 quart per acre by aerial or 3 quarts per acre by ground equipment. **Do not** apply to corn grown for seed.

RICE

WEED RESPONSE RATINGS FOR RICE HERBICIDES[a]

	Amazon Sprangletop	Ammania (Redstem)	Barnyardgrass[b]	Bearded Sprangletop	Broadleaf Signalgrass	Crabgrass	Dayflower	Ducksalad	Eclipta	Fall Panicum	Flatsedges	Gooseweed	Hemp Sesbania (coffeebean)	Morningglory	Northern Jointvetch	Nutsedge	Palmer Amaranth[c]	Smartweed	Spikerush	Texasweed (2-3 leaf)	Red Rice	Volunteer Glyphosate-Resistant Soybean[d]	Glyphosate-Resistant Horseweed[e]
Clearfield Rice System																							
Beyond	5	**8**	**8**	5	**9**	-	6	2	6	7	**8**	-	3	**8**	3	-	6	5	-	5	**9**	0	-
Clearpath	6	**8**	**9**	6	**9**	**9**	6	6	**8**	6	**9**	0	7	**8**	7	**8**	5	6	-	7	**8**	-	-
Newpath (2 applications)	6	**8**	**9**	**8**	**9**	**9**	5	7	0	**9**	**9**	5	0	7	0	**8**	6	7	**9**	5	**9**	0	-
Preemergence/ Delayed Pre																							
Bolero delayed pre	7	7	**8**	7	4	**7**	**8**	7	**8**	7	7	6	4	4	5	4	-	5	7	5	0	-	-
Command pre	**8**	0	**9**	**8**	**9**	**9**	0	0	0	**9**	0	0	2	3	3	0	0	2	0	0	0	0	-
Pendimethalin delayed pre	**8**	1	**9**	7	**8**	**8**	0	4	0	**8**	0	0	0	0	0	0	7	2	0	0	0	0	-
Quinclorac pre	0	0	**9**	0	**9**	**9**	5	2	**8**	**8**	5	3	6	7	7	0	0	0	-	-	0	-	-
Quinclorac + Bolero delayed pre	**8**	7	**9**	**8**	**9**	**9**	7	7	**9**	**9**	**8**	5	**8**	**8**	**8**	0	-	5	7	-	0	-	-
Quinclorac + Pendimethalin delayed pre	**8**	3	**9**	**8**	**9**	**9**	3	0	**8**	**9**	5	3	6	**8**	7	0	7	2	-	-	0	-	-
Postemergence (Before Flood)																							
Aim	0	6	0	0	0	0	7	5	7	0	0	-	**9**	**9**	7	0	7	**9**	0	6	0	2	-
Basagran	0	**8**	0	0	0	0	**9**	7	7	0	**8**	7	3	3	3	7	2	7	**8**	5	0	0	-
Clincher SF	**8**	0	**8**	**9**	**9**	6	0	0	0	**9**	0	0	0	0	0	0	0	0	0	0	0	0	0
Grandstand	0	**8**	0	0	0	0	6	4	**9**	0	6	5	**9**	**9**	**8**	0	**8**	6	5	**8**	0	**9**	6
Grasp	0	7	**8**	0	0	0	**8**	**9**	**8**	2	**9**	-	**8**	5	**8**	3	6	7	**8**	6	0	**9**	**8**
Grasp Xtra	0	7	**8**	0	0	0	**9**	**9**	**9**	2	**9**	-	**9**	**8**	**9**	3	**8**	7	**8**	**8**	0	**9**	**8**
League	0	**8**	0	0	0	0	**8**	7	**8**	0	**8**	-	**9**	**8**	**8**	**8**	5	7	-	**8**	0	**8**	-
Londax	0	**8**	0	0	0	0	**8**	**9**	**8**	0	**8**	**9**	4	0	7	6	5	6	**8**	5	0	-	-
Permit	0	0	0	0	0	0	**8**	4	5	0	**8**	-	**8**	4	7	**9**	6	4	-	6	0	**8**	6
Permit Plus	0	**9**	0	0	0	0	**8**	7	**9**	0	**8**	-	**9**	7	7	**8**	6	**8**	-	7	0	**8**	6
Propanil	5	6	**9**	4	**9**	7	5	7	**8**	**8**	**9**	5	**9**	5	5	4	**8**	6	**9**	6	0	**8**	1
Propanil + Basagran	5	**9**	**9**	4	**9**	7	**9**	7	**9**	**9**	**9**	7	**9**	5	**9**	6	**8**	**8**	**9**	6	0	**8**	1
Propanil + Bolero (or RiceBeaux)	**9**	**8**	**9**	**9**	**9**	7	**8**	**8**	**9**	**9**	**9**	6	**9**	6	5	5	**8**	6	**9**	7	0	**8**	2
Propanil + Grandstand	5	**9**	**9**	4	**9**	7	5	7	**9**	**9**	**8**	**8**	**9**	**9**	**9**	5	**9**	7	**9**	**8**	0	**9**	6
Propanil + Londax (or Duet)	5	**9**	**9**	4	**9**	7	**8**	7	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**8**	**8**	**9**	7	0	**8**	-
Propanil + Pendimethalin	**9**	7	**9**	**9**	**9**	7	5	7	**9**	**9**	**9**	5	**9**	5	5	4	**8**	5	7	6	0	**8**	1
Propanil + quinclorac	5	6	**9**	4	**9**	7	5	6	**8**	**9**	**9**	5	**9**	**8**	**9**	5	**8**	5	**9**	6	0	**8**	**8**
Propanil Sequential (3 + 3)	**8**	6	**9**	7	**9**	7	6	7	**9**	**9**	**9**	5	**9**	5	5	6	**8**	**8**	**9**	7	0	**8**	-
Quinclorac early post	0	3	**9**	0	**9**	7	3	3	**9**	6	5	-	**8**	**8**	**8**	0	3	0	-	3	0	2	6
Quinclorac + Aim (or Broadhead)	0	7	**9**	0	**9**	7	7	5	**9**	6	5	-	**9**	**9**	**8**	0	**8**	**8**	-	6	0	2	6
Quinclorac + Bolero	7	5	**9**	7	**9**	**9**	7	7	**9**	**8**	7	5	**8**	**8**	**8**	0	5	4	7	-	0	5	6
Quinclorac + Pendimethalin	0	3	**9**	0	**9**	**8**	3	3	**8**	6	5	-	**8**	**8**	**8**	0	5	2	-	6	0	2	6
Regiment	2	6	**9**	2	3	0	**8**	**9**	7	0	**8**	0	**8**	6	7	0	6	**9**	-	**8**	0	**9**	5
Ricestar HT	**8**	0	**9**	**9**	**9**	**8**	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Storm	2	**9**	3	2	3	3	7	**8**	7	2	**8**	-	**9**	**8**	6	7	7	**8**	-	**8**	0	0	-
Strada	0	**8**	0	0	0	0	7	6	**8**	0	**9**	-	**9**	7	**9**	7	5	6	-	6	0	**8**	5
Postemergence (After Flood)																							
Grandstand	0	**9**	0	0	0	0	-	3	**8**	0	5	**9**	**8**	-	-	-	6	4	7	4	0	-	-
Propanil	0	4	4	0	4	4	0	3	4	4	5	0	**8**	0	0	3	7	5	7	4	0	-	-
Propanil + Grandstand	0	**9**	2	0	2	2	4	5	6	2	6	7	**9**	**8**	**8**	2	6	4	**9**	4	0	-	-
Ultra Blazer	0	0	0	0	0	0	0	0	0	0	0	0	**9**	**8**	6	0	6	0	0	4	0	0	-
2,4-D	0	**9**	0	0	0	0	**9**	**9**	**9**	0	**8**	6	**9**	**9**	5	5	4	6	**8**	3	0	-	-

[a]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary.

[b]Barnyardgrass resistance to Group 2 (Beyond, Grasp, Newpath, Regiment), Group 7 (propanil), and Group 26 (quinclorac) herbicides has been identified in Mississippi.

[c]Control ratings apply for herbicide applications made to Palmer amaranth 2 to 3 inches tall. Palmer amaranth resistance to Group 2 herbicides (Beyond, Grasp, League, Londax, Newpath, Permit, Permit Plus, Regiment, and Strada) is prevalent across Mississippi.

[d]Control ratings do not apply to sulfonylurea-tolerant soybean (STS).

[e]Control ratings apply only to glyphosate-resistant horseweed emerging in the spring. Lower control can be expected for glyphosate-resistant horseweed emerging in the fall.

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ROTATIONAL CROP RESTRICTIONS

Corn herbicides	Rotation interval[1]						
	Corn	Cotton	Grain sorghum	Rice	Soybeans	Wheat	Other grains
2,4-D	none	3 m	7 d	28 d	15 d	7 d	none
Aim	none	none	none	none	none	none	none
Basagran	none	none	none	none	none	none	none
Beyond	8.5 m	9 m	9 m	9 m[2]	None	3 m	9 m
Bolero	6 m	6 m	6 m	none	6 m	6 m	6 m
Broadhead	12 m	12 m	12 m	none	12 m	12 m	12 m
Clearpath[2]	10 m	18 m	18 m	18 m[3]	10 m	10 m	10 m[4]
Clincher SF	3 m	3 m	3 m	none	3 m	3 m	3 m
Command	9 m	None[5]	9 m	none	none	12 m	12 m
Duet	60 d	60 d	60 d	none	60 d	60 d	60 d
Firstshot	14 d	14 d	7 d	none	7 d	none	7 d
Glyphosate	none	none	none	none	none	none	none
Grandstand	4 m	4 m	4 m	21 d	4 m	4 m	4 m
Grasp	3 m	3 m	3 m	none	3 m	3 m	3 m
Grasp Xtra	3 m	3 m	3 m	none	3 m	3 m	3 m
League	12 m	8 m	12 m	none	12 m	12 m	24 m
Londax	4 m	4 m	4 m	none	4 m	4 m	4 m
Newpath[2]	8.5 m	18 m	18 m	18 m[3]	none	4 m	18 m[6]
Paraquat	none	none	none	none	none	none	none
Pendimethalin	ns	none	ns	ns	none	4 m	4 m
Permit	2 m	4 m	2 m	none	9 m	2 m	2 m
Permit Plus	2 m	4 m	2 m	none	2 m[7]	2 m	2 m
Propanil	2 m	2 m	2 m	none	2 m	2 m	2 m
Quinclorac	309 d	309 d	309 d	none	309 d	309 d	309 d
Regiment	ns	ns	ns	none	ns	ns	none
Ricestar HT	30 d	30 d	30 d	none	30 d	4 m	4 m
Sharpen	none	4 m	none	15 d	3 m	none	none
Storm	100 d	100 d	100 d	none	none	40 d	40 d
Strada	3 m	6 m	12 m		6 m	3 m	3 m
Ultra Blazer	100 d	100 d	100 d	none	none	40 d	40 d
Valor	30 d[9]	30 d[8,9]	30 d[9]	30 d[9]	none	30 d[9]	4 m

[1]d, m, y, spring, fall, and ns indicate days after application, months after application, years after application, spring following application, fall following application, and next season, respectively.

[2]For Newpath use rates greater than 8 ounces per acre per season up to 12 ounces per acre per season, only soybean may be planted the following year.

[3]Clearfield rice may be planted any time after application of Beyond, Clearpath, or Newpath.

[4]Rotational interval for oats is 18 months.

[5]Do not plant cotton unless disulfoton or phorate organophosphate insecticide is applied in-furrow with the seed at a minimum of 0.75 pounds active ingredient per acre.

[6]Rotational interval for rye is 4 months, and rotational interval for barley is 9.5 months.

[7]Rotational interval for soybean is 9 months if soil pH is more than 7.5.

[8]Rotational interval for no-till cotton may be reduced to 21 or 14 days if application rate of Valor is reduced to 1.5 or 1 ounce per acre, respectively.

[9]At least 1 inch of rainfall must be received between the Valor application and planting or crop injury may occur.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
flumioxazin — 0.51 to 1.02 lb/A	Valor 51 WDG — 1 to 2 oz/A	30 days preplant	Will enhance control of cutleaf evening primrose, henbit, Carolina geranium, and wild mustard **when applied in a burndown program with glyphosate, paraquat, or 2,4-D**	**Used in a burndown program** at 2 ounces per acre will provide residual control of horseweed, henbit, chickweed, and dandelion.
glyphosate — 1 to 1.5 lb/A	See glyphosate table on pages 5-6 for rates.	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	Apply to actively growing weeds less than 6 inches tall. Use higher rate for weeds more than 6 inches tall. Apply up to 5 pounds of active ingredient per acre for control of perennial weeds. See labels for specific weeds. Glyphosate may be tank-mixed with soil-applied herbicides for residual activity.
glyphosate + clomazone — 1 to 1.5 lb/A + 0.3 to 0.6 lb/A	See glyphosate table on pages 5-6 for rates + Command 3 ME — 0.8 to 1.6 pt/A	Up to 14 days before planting	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate and clomazone. The field must be free of standing water at the time of application. Antagonism may occur in some situations. Use the full rate of glyphosate. Sequential postemergence grass herbicide application will be needed.
halosulfuron – 0.031 to 0.062 lb/A	Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Preplant or preemergence	Yellow nutsedge, annual weeds	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Application is safe to rice when soil pH is less than 8.0. Do not make more than one preplant/preemergence application per growing season.
halosulfuron + thifensulfuron — 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Preplant or preemergence	Pennsylvania smartweed, yellow nutsedge, and annual weeds	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Application is safe to rice when soil pH is less than 8.0. Do not make more than one preplant/preemergence application per growing season.
paraquat — 0.5 to 1 lb/A	2 lb/gal formulation — 2 to 4 pt/A; 3 lb/gal formulation — 1.33 to 2.67 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds. Use lower rates on weeds 1-3 inches tall and higher rates on weeds 4-6 inches tall.	Avoid off-site movement to emerged vegetation. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Command at 0.8-1.6 pints per acre may be added for residual control of grasses.
saflufenacil — 0.022 to 0.044 lb/A	Sharpen 2.85 SC — 1 to 2 oz/A	15 days preplant	Horseweed and other broadleaf weeds	See Sharpen label for surfactant information. Target weeds should be less than 4 inches in height or diameter. Sharpen may be tank-mixed with glyphosate, paraquat, or glufosinate to improve grass and broadleaf control. **Do not apply more than 2 ounces per acre in a single season. Do not apply within 45 days of flooding.**
thifensulfuron + tribenuron — 0.016 to 0.025 lb/A	Firstshot 50 SG — 0.5 to 0.8 oz/A	Preplant or preemergence	Winter annual and some perennial broadleaf weeds, including curly dock and Pennsylvania smartweed	Apply to actively growing weeds. May be mixed with other preplant herbicides to broaden weed spectrum. Extend time from application to planting to 7 days when Firstshot is used on light-textured soil (sand, sandy loam) or when Firstshot is used on high pH soils (>7.9).
thiobencarb — 4 lb/A	Bolero 8 EC— 4 pt/A	Preplant/preflood **(Water-seeded rice only)**	Barnyardgrass, sprangletop, and aquatic weeds	Prepare seedbed for **water seeding** with levees constructed. Destroy all vegetation prior to Bolero application. Apply Bolero and establish flood immediately. **Wait 3 days after flood establishment before seeding.**
2,4-D amine — 0.5 to 1 lb/A	Various formulations — 1 to 2 pt/A	During winter and early spring at least 30 days prior to planting	Annual and perennial broadleaf weeds	Do not apply by air after March 31. Do not apply more than 2.5 pints per growing season.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Clearfield Rice System				
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated. **Sequential application to 3- to 5-leaf rice required.**	Red rice and annual grasses; also controls yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Flush for activation if rainfall does not occur within a few days of planting. This application must be followed by one postemergence application of Newpath or Beyond. **Avoid off-site movement of Newpath onto conventional rice varieties.**
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preemergence. **Sequential application to 3- to 5-leaf rice required.**	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Flush for activation if rainfall does not occur within a few days of planting. This application must be followed by one postemergence application of Newpath or Beyond. **Avoid off-site movement of Newpath onto conventional rice varieties.**
imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	3-leaf through 5-leaf rice before flooding	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. This application must be preceded by one preplant-incorporated or preemergence application of Newpath. **Avoid off-site movement of Newpath onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr — 0.063 to 0.094 lb/A followed by imazethapyr — 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A followed by Newpath 2 AS — 4 to 6 oz/A	First postemergence application at spike to 1-leaf rice followed by second postemergence application approximately 14 days later	Red rice and annual grasses; also controls flatsedges and yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** A soil-applied herbicide such as Command should be used in the first Newpath application for sprangletop control and to aid in residual control of annual grasses. Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. **Avoid off-site movement of Newpath onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr + quinclorac — 0.063 + 0.312 lb/A followed by imazethapyr — 0.063 to 0.094 lb/A	Clearpath 75 DF — 0.5 lb/A followed by Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated, preemergence, or postemergence from spike to 1-leaf rice followed by a postemergence application of Newpath approximately 14 days later	Red rice and annual grasses; also controls eclipta, flatsedges, morningglory, and yellow nutsedge. Improved control of some grasses and broadleaf weeds over Newpath alone.	**Use on Clearfield rice varieties and hybrids only.** Tank-mixing with other herbicides will be required for control of broadleaf weeds, including hemp sesbania, northern jointvetch, and eclipta. **Avoid off-site movement of Newpath onto conventional rice varieties.** Clearpath at 0.5 pound per acre provides 4 ounces of Newpath and 0.4 pound of Facet. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre. See *General Instructions and Remarks for Quinclorac.*
imazamox — 0.039 to 0.047 lb/A	Beyond 1 AS — 5 to 6 oz/A	**After at least one application of Newpath or Clearpath.** Apply from 4-leaf rice until 14 days after panicle initiation on Clearfield varieties and from 4-leaf rice to panicle initiation on Clearfield hybrids.	Barnyardgrass, broadleaf signalgrass, fall panicum, morningglory, and red rice	**Use on Clearfield rice varieties and hybrids only.** Beyond may be substituted for the second application of Newpath, but two applications are required before flooding. Some Clearfield hybrids are less tolerant to Beyond than others. An emergency salvage application of Beyond may be applied for late-season suppression of red rice, but the rate should not exceed 10 ounces in a single growing season. **Avoid off-site movement of Beyond onto conventional rice varieties.** Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.

Preemergence/Delayed Pre

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
clomazone — 0.3 to 0.6 lb/A	Command 3 ME — 0.8 to 1.6 pt/A	Preemergence	Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, and sprangletop	Command may be applied from planting to rice emergence but before weed emergence. Do not apply to recently land-formed fields. If grasses emerge after application, rainfall or flushing may be needed for activation or reactivation. **Caution: follow label when tank-mixing.**

Command 3ME Herbicide Applied Alone
RATES AND WEEDS CONTROLLED

Soil Texture	Broadcast Rates Per Acre*
Coarse (light) Soils: (sand, loamy sand, sandy loam)	Do not use
Medium Soils: (loam, silt, silt loam, sandy clay, sandy clay loam)	0.8 to 1.125 pt/A (0.3 to 0.4 lb ai)
Fine (heavy) Soils: (silty clay, clay loam, silty clay loam, clay)	1.33 to 1.6 pt/A (0.5 to 0.6 lb ai)

*Select lower to higher rates based on lighter to heavier soils

clomazone + quinclorac — 0.3 to 0.6 lb/A + 0.25 to 0.5 lb/A	Command 3 ME — 0.8 to 1.6 pt/A + 75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84)	Preemergence or delayed preemergence	Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, sprangletop, and eclipta	See *Special Instructions and Remarks* for Command and quinclorac. If grasses emerge after application, rainfall or flushing will be required for activation or reactivation of the herbicide.
glyphosate — 1 to 1.5 lb/A + clomazone — 0.3 to 0.6 lb/A	See glyphosate table on pages 5-6 for rates + Command 3 ME — 0.8 to 1.6 pt/A	From planting to rice emergence. **Do not apply if rice is beginning to emerge.**	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate and Command. The field must be free of standing water at application. Antagonism may occur in some situations. **Use the full rate of glyphosate.** If grasses emerge after application, rainfall or flushing will be required for activation or reactivation of the herbicide. Sequential postemergence grass herbicide application will be needed.
glyphosate + pendimethalin — 1 to 1.5 lb/A + 0.75 to 1 lb/A	See glyphosate table on pages 5-6 for rates + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Winter annual weeds and residual grass control	See *Special Instructions and Remarks* for glyphosate alone and for pendimethalin.
imazosulfuron — 0.15 to 0.28 lb/A	League 75 WG — 3.2 to 6 oz/A	Preemergence	Hemp sesbania and annual broadleaf weeds	**Rice injury may occur if League is applied at 6 ounces per acre on clay soils with pH more than 8.** Soybeans may not be planted for 12 months after League application. **A half-mile buffer to emerged non-STS soybeans is required for aerial applications.**
pendimethalin — 0.75 to 1 lb/A	Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses, including barnyardgrass, broadleaf signalgrass, and sprangletop	Apply after the rice seed has absorbed water and germinated and after the soil has been previously sealed over the seed by at least 1 inch of rainfall or by irrigation (flush). If the soil has not been sealed by rain or flush, apply when 80% of germinated seeds have primary root (radicle) or shoot at least 0.5 inch long. If applied to soil prior to these conditions, or to cracked soil, the stand reduction or stunting of rice may occur. Under some conditions, **use of gibberellic acid-treated seed, heavy rainfall or flushing after application** may result in herbicide injury to rice. Rice can overcome moderate injury with appropriate cultural practices.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
quinclorac — 0.25 to 0.5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below)	Preemergence or delayed preemergence	Annual grasses except sprangletop; also controls eclipta	**Do not** use on sand or loamy sand soils. Apply in 10-40 gallons per acre by ground and 5 gallons per acre by air. See *General Instructions and Remarks for Quinclorac*. Do not apply on precision-cut land until the second rice crop. Rice seed exposed to the spray may be severely injured.
quinclorac + pendimethalin — 0.25 to 0.5 lb/A + 0.75 to 1 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below) + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses, including sprangletop; Also controls eclipta	See *Special Instructions and Remarks* for pendimethalin. See *General Instructions and Remarks for Quinclorac*. **Do not** apply on precision-cut land until the second rice crop. Rice seed exposed to the spray may be severely injured.
quinclorac + thiobencarb — 0.25 to 0.5 lb/A + 3 to 4 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table below) + Bolero 8 EC — 3 to 4 pt/A	Preemergence or delayed preemergence	Annual grasses, including sprangletop; Also controls eclipta	See *General Instructions and Remarks for Quinclorac*. **Do not** apply on precision-cut land until the second rice crop. Rice seed exposed to the spray may be severely injured. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
thiobencarb — 4 lb/A	Bolero 8 EC — 4 pt/A	Delayed preemergence (1 to 5 days before rice and weed emergence)	Barnyardgrass, sprangletop, and aquatic weeds	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
thiobencarb + pendimethalin — 4 lb/A + 0.75 to 1 lb/A	Bolero 8 EC — 4 pt/A + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A	Delayed preemergence (1 to 5 days before rice and weed emergence)	Barnyardgrass, broadleaf signalgrass, sprangletop, and aquatic weeds	See *Special Instructions and Remarks* for pendimethalin. Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury..

GENERAL INSTRUCTIONS AND REMARKS FOR QUINCLORAC. See table below for soil type restrictions. Quinclorac on soil requires water for activation. For preemergence application, apply to moist soil or apply to dry soil and flush the field within 3 to 5 days. For postemergence application, flush 3 to 14 days after application or when new grass/weeds have emerged and are less than 1 inch tall.

1. DO NOT apply more than 0.67 pound per acre of 75 DF formulation, 1 pint per acre of 4 L formulation per season, or 42 ounces per acre of 1.5 L formulation.
2. DO NOT use on soil that does not have good water-holding capacity.
3. DO NOT use quinclorac in tank mixes other than those listed on product labels or supplemental labels.
4. DO NOT allow quinclorac to drift onto sensitive crops such as cotton, soybeans, corn, or vegetables.
5. DO NOT plant any crop other than rice for a period of 309 days following quinclorac application.
6. DO NOT use quinclorac on precision-cut fields until the second rice crop.

Preemergence Application for Drill-Seeded Rice

Soil texture	75 DF rate	4 L rate	1.5 L rate
sand, loamy sand	Do not use	Do not use	Do not use
sandy loam	0.33–0.44 lb/A	0.5–0.67 pt/A	21–28 oz/A
loam, silt loam, silt, sandy clay loam	0.44–0.5 lb/A	0.67–0.75 pt/A	28–32 oz/A
silty clay loam, clay loam, sandy clay, silty clay, clay	0.5–0.67 lb/A	0.75–1 pt/A	32–42 oz/A

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence (Before Flood)				
acifluorfen + bentazon — 0.25 to 0.5 lb/A + 0.25 to 0.5 lb/A	Storm 4 L — 1.5 pt/A	After rice tillering to boot	Dayflower, flatsedges, hemp sesbania, morningglory, redstem, smartweed, and yellow nutsedge	Add a nonionic surfactant at 0.25% v/v.
bentazon — 0.75 to 1 lb/A	Basagran 4 L — 1.5 to 2 pt/A in 10 gal water for aerial application	At least 24 hours before flooding. On flooded fields, lower flood to expose weed foliage.	Dayflower, flatsedges, smartweed, redstem, and yellow nutsedge	Refer to label for rates and stages of weed growth. Apply early to actively growing weeds. Do not apply to submerged weeds because thorough coverage is necessary. A second application may be made 10 to 14 days later if needed. Do not apply more than 2 pounds per acre per season. Tank mix with propanil to increase weed spectrum. Add a nonphytotoxic crop oil concentrate at 1.25% v/v.
bispyribac-sodium — 0.02 to 0.033 lb/A	Regiment 80 WP — 0.4 to 0.67 oz/A	3-leaf rice but before first elongated internode exceeds 0.5 inch	Barnyardgrass, junglerice, johnsongrass, hemp sesbania, ducksalad, and Pennsylvania smartweed	See Regiment label for a list of adjuvants approved by Valent. Apply in at least 10 gallons per acre and do not exceed 1.06 ounces per year. Avoid off-site movement to soybean. It provides little or no control of sprangletop. Medium-grain varieties may be more sensitive to Regiment under stressed conditions.
carfentrazone — 0.025 to 0.05 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A	2-leaf rice or larger and weeds up to 4 inches tall	Cocklebur, hemp sesbania, morningglory, and smartweed	Do not apply more than 8.6 ounces per season. If flood is lowered, return to normal 24 hours following treatment. Hold water 30 days after treatment. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v. Avoid applications from flag leaf emergence through harvest-aid application.
carfentrazone + halosulfuron — 0.025 to 0.05 lb/A + 0.032 to 0.063 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	After rice reaches 2-leaf stage	Flatsedges, hemp sesbania, morningglory, smartweed (1- to 2-leaf), and yellow nutsedge	See *Special Instructions and Remarks* for Aim and Permit/Halomax. Add nonionic surfactant at 0.25% v/v.
carfentrazone + quinclorac — 0.015 to 0.03 + 0.19 to 0.375 lb/A	Aim 2 EC — 1 to 2 oz/A + 75 DF — 0.25 to 0.5 lb/A or equivalent rate of liquid formulation (See table on page 84); Broadhead 70 DF — 6 to 12 oz/A	Preplant, preemergence, or between the 2-leaf rice stage and permanent flood	Barnyardgrass, morningglory, hemp sesbania, and other grass and broadleaf weeds	See *Special Instructions and Remarks* for Aim. See *General Instructions and Remarks for Quinclorac*. Add nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
clomazone 0.3 to 0.6 lb/A	Command 3 ME — 0.8 to 1.6 pt/A	1- to 2-leaf rice.	Residual control of annual grasses	For control of existing grass weeds present at time of application, include a postemergence grass herbicide such as Clincher SF, propanil, quinclorac, or Ricestar HT.
cyhalofop-butyl — 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	1-leaf rice up to 60 days before harvest.	Barnyardgrass, broadleaf signalgrass, fall panicum, seedling johnsongrass, sprangletop (13.5 oz up to 4-leaf grass)	Apply at least 10 gallons per acre by air or ground. A nonphytoxic crop oil concentrate or methylated seed oil must be used at 1 quart per acre. Soil moisture is critical for good activity. Tank-mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.**
fenoxaprop + safener — 0.077 to 0.1088 lb/A	Ricestar HT 0.58 EC — 17 to 24 oz/A	1-leaf rice to tillering but before panicle initiation	Barnyardgrass, sprangletop, broadleaf signalgrass, johnsongrass (seedling), and fall panicum	**Do not** apply within 48 hours of an application of methyl parathion. Soil moisture is critical for good activity. Tank-mix only with approved herbicides on Ricestar HT label.

Rice Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
halosulfuron — 0.032 to 0.063 lb/A	Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Prior to rice emergence until after flooding	1- to 6-inch yellow or purple nutsedge, 0.67 oz/A; 6-to 12-inch sedges, 1-1.33 oz/A	Do not appy within 48 days of harvest. Avoid off-site movement to soybeans. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
halosulfuron + thifensulfuron — 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Before rice emergence until 48 days before harvest	Pennsylvania smartweed, yellow nutsedge, and annual weeds	Do not apply within 48 days of harvest. Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Do not exceed 1.5 ounces per acre in a season.
imazosulfuron — 0.15 to 0.19 lb/A	League 75 WDG — 3.2 to 4 oz/A	2-leaf rice but before 2-inch internode elongation	Hemp sesbania, morningglory, and annual weeds	See League label for a list of adjuvants and tank mixtures approved by Valent. Soybeans may not be planted for 12 months after League application. **A half-mile buffer to emerged non-STS soybeans is required for aerial applications.**
orthosulfamuron — 0.053 to 0.065 lb/A	Strada 50 WG — 1.7 to 2.1 oz/A	Early post-emergence to 0.5 inch internode elongation	Flatsedges, hemp sesbania, and northern jointvetch	Tank-mix with other herbicides such as Command, Newpath, or propanil to broaden spectrum. See label for surfactant requirements.
penoxsulam — 0.031 to 0.036 lb/A	Grasp 2 SC — 2 to 2.3 oz/A	Emergence to 60 days before harvest	Up to 7-leaf eclipta, hemp sesbania, northern jointvetch, and flatsedges; up to 4-leaf ducksalad and barnyardgrass	Do not apply to drought-stressed weeds. Little to no control of sprangletop, broadleaf signalgrass, and fall panicum. May cause stunting and root pruning, especially if higher than labeled rates are applied. **Avoid use on high pH soils (>7.8).** Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
penoxsulam + triclopyr lb/A — 0.031 to 0.043 lb/A + 0.19 to 0.26 lb/A	Grasp Xtra 1.74 SC — 16 to 22 oz/A	2- to 3-leaf rice to 0.5-inch internode elongation	Barnyardgrass and broadleaf weeds	Add nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre. May cause stunting and root pruning, especially if higher than labeled rates are applied. **Rice injury can be severe if soil pH is more than 7.8**. However, research indicates Clearfield rice varieties are more tolerant than conventional varieties on soils with pH greater than 7.8. Delay flood for 72 hours after application.
propanil — 3 to 6 lb/A	3 to 6 qt/A of 4 lb/gal formulation in 10 gal water for aerial application and 15 to 20 gal water for ground application	1- to 4-leaf barnyardgrass	Barnyardgrass and other grasses and broadleaf weeds	See *General Instructions and Remarks for Propanil*. If grass is in the 4- to 5-leaf stage, apply 4 to 5 pounds of active ingredient per acre. To prevent reinfestation, flood 1 or 2 days after application. Weed foliage must not be covered with water at time of application. Consult label concerning adjuvant use.

GENERAL INSTRUCTIONS AND REMARKS FOR PROPANIL: For aerial application, apply 10 gallons of spray mixture and avoid drift to susceptible crops. Complete spray coverage is necessary. Weeds should be growing actively at treatment time. Rice plants may show yellowing after treatment; however, plants recover quickly. **Do not** exceed 6 pounds per acre per application or 8 pounds per acre per season. **Do not** apply when rain is expected within 6 hours or during periods when daily maximum temperatures are below 75 °F, or above 100 °F. Application during high temperatures may result in excessive rice injury. **DO NOT** use in spray equipment that has contained organophosphate insecticides unless the equipment has been cleaned thoroughly, and **DO NOT** apply these insecticides within 14 days before or after applying propanil.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
propanil — 6 to 8 lb/A (For split application where flooding is delayed)	Total 6 to 8 qt/A of 4 lb/gal formulation in two applications	Split application, 3 to 4 lb/A when weeds are in 1- to 3-leaf stage and apply second 3 to 4 lb/A treatment when needed	Barnyardgrass, sprangletop, and other grasses and broadleaf weeds	See *General Instructions and Remarks for Propanil*. Flood 1 or 2 days after final application. This treatment may not give satisfactory control of sprangletop species. Weed foliage must not be covered with water at time of application. Consult label concerning adjuvant use.
propanil + bensulfuron — 3 to 5 lb/A + 0.038 to 0.063 lb/A	propanil — 3 to 5 qt/A of 4 lb/gal formulation + Londax 60 DF — 0.75 to 1 oz/A or Duet 4.03 F — 3 to 5 qt/A	1 to 7 days before flood	Many grass and broadleaf weeds and yellow nutsedge	See *General Instructions and Remarks for Propanil*. For best results, maintain permanent flood and keep water as static as possible. Consult the label concerning use of surfactants. For increased control of nutsedge, add Permit at 0.25 to 0.33 ounce per acre.
propanil + halosulfuron — 3 to 4 lb/A + 0.032 to 0.063 lb/A	propanil — 3 to 4 qt/A of 4 lb/gal formulation + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	Apply to emerged weeds.	Eclipta, flatsedges, hemp sesbania, northern jointvetch, morningglory, and yellow nutsedge	See *General Instructions and Remarks for Propanil.* See *Special Instructions and Remarks* for Permit/Halomax.
propanil + triclopyr — 3 to 4 lb/A + 0.125 to 0.25 lb/A	propanil — 3 to 4 qt/A of 4 lb/gal formulation + Grandstand 3 SL — 0.5 to 0.67 pt/A	After rice reaches the 2-leaf stage and before weeds exceed 6 inches in height. Use no more than 0.5 pt/A of Grandstand if applying to 2- to 3-leaf rice and up to 0.67 pt/A if applying after 4-leaf stage.	Barnyardgrass, morningglory, hemp sesbania, northern jointvetch, eclipta, and redstem	See *General Instructions and Remarks for Propanil*. See *Special Instructions and Remarks* for Grandstand. Flood should be delayed for 72 hours after application.
propanil + pendimethalin — 3 to 4 lb/A + 0.75 to 1 lb/A	Propanil — 3 to 4 qt/A of 4 lb/gal formulation + Prowl H_2O 3.8 CS — 1.6 to 2.1 pt/A or 3.3 EC formulation — 1.8 to 2.4 pt/A in 10 gal water for aerial application	After rice emerges and barnyardgrass is in 1- to 3-leaf stage	Postemergence control of barnyardgrass and other grasses and broadleaf weeds; residual control of barnyardgrass, broadleaf signalgrass, crabgrass, and sprangletop	See *General Instructions and Remarks for Propanil*. The seedbed should be firm and free of large clods, trash, and surface water at time of application. Fields should be flushed if adequate rainfall does not occur within 7 days. **Do not** make more than one application of pendimethalin per season.
quinclorac — 0.25 to 0.5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84)	Early postemergence	1- to 2-leaf barnyardgrass, broadleaf signalgrass, hemp sesbania, and eclipta; controls 2- to 6-leaf morningglory.	Add a nonphytotoxic crop oil concentrate at 1 quart per acre to maximize weed control. Quinclorac can be applied to water-seeded rice after first true leaf of rice has developed. **Do not** use on precision-cut fields until the second year as rice injury might occur. Does not control sprangletop. See *General Instructions and Remarks for Quinclorac*.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	**Formulation needed to treat 1 acre broadcast**	**Time of application**	**Weeds controlled**	**Special instructions and remarks**
quinclorac + acifluorfen — 0.25 to 0.5 lb/A + 0.125 to 0.25 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84) + Ultra Blazer 2 L — 0.5 to 1 pt/A	After rice reaches 3-leaf stage	Grasses and broadleaf weeds	Add a nonionic surfactant at 0.25% v/v. See label for mixing instructions. **Do not apply to recently land-formed fields.** See *General Instructions and Remarks for Quinclorac*.
quinclorac + acifluorfen + bentazon — 0.25 to 0.5 lb/A + 0.75 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84) + Storm 4 L — 1.5 pt/A	After rice reaches 3-leaf stage	Grasses and broadleaf weeds	Add a nonionic surfactant at 0.25% v/v. See label for mixing instructions. **Do not apply to recently land-formed fields.** See *General Instructions and Remarks for Quinclorac*.
quinclorac + fenoxaprop + safener — 0.25 to 0.5 lb/A + 0.077 to 0.1088 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84) + Ricestar HT 0.58 EC — 17 to 24 oz/A	Apply to small, actively growing weeds	Grasses and broadleaf weeds, including eclipta hemp sesbania, and morningglory	See *General Instructions and Remarks for Quinclorac*. See *Special Instructions and Remarks* for Ricestar HT. Soil moisture is critical for good activity. Rainfall or flush will be required for residual grass control from quinclorac after application.
quinclorac + propanil — 0.25 to 0.5 lb/A + 3 to 5 lb/A	75 DF — 0.33 to 0.67 lb/A or equivalent rate of liquid formulation (See table on page 84) + propanil — 3 to 5 qt/A of 4 lb/gal formulation	Early postemergence	Grasses and broadleaf weeds	See label for mixing instructions. **Do not** use on precision-cut fields until the second year as rice injury might occur. Weed foliage must not be covered with water at time of application. Consult label concerning use of surfactants or crop oil concentrates. See *General Instructions and Remarks* for quinclorac and propanil.
triclopyr — 0.25 to 0.375 lb/A	Grandstand 3 SL — 0.67 to 1 pt/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, eclipta, morningglory, northern jointvetch, and redstem	Flood must be delayed 72 hours to prevent rice injury for applications made prior to flood. If flood is lowered for application, do not expose the crown of rice plants and wait 48 hours before raising the flood level. Add a nonionic surfactant at 0.25% or nonphytotoxic crop oil concentrate at 1% v/v. Do not use on precision-cut land until the second rice crop.
triclopyr + halosulfuron — 0.25 to 0.375 lb/A + 0.032 to 0.063 lb/A	Grandstand 3 SL — 0.67 to 1 pt/A + Permit or Halomax 75 WG — 0.67 to 1.33 oz/A	3-leaf to 0.5-inch internode elongation	Flatsedges, hemp sesbania, morningglory, northern jointvetch, and yellow nutsedge	See *Special Instructions and Remarks* for Grandstand and Permit/Halomax. Add nonionic surfactant at 0.25% v/v. Do not apply within 48 days of harvest.
thiobencarb + propanil — 3 to 4 lb/A + 3 to 4 lb/A	Bolero 8 EC — 3 to 4 pt/A + propanil — 3 to 4 qt/A of 4 lb/gal formulation or RiceBeaux 6 EC — 4 qt/A	Early postemergence. Grass in 1- to 3-leaf stage, aquatics less than 0.5 inch tall, and broadleaf weeds less than 2 inches tall.	Grass and broadleaf weeds	See *General Instructions and Remarks for Propanil*. Soil should be moist at the time of application and not allowed to crack after application. Do not apply to stressed rice. RiceBeaux at 4 quarts per acre provides 3 pints of Bolero and 3 quarts of propanil per acre.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence (After Flood)				
acifluorfen — 0.125 to 0.25 lb/A	Ultra Blazer 2 L — 0.5 to 1 pt/A in 5 to 10 gal water	Apply to actively growing sesbania before it flowers. Apply to rice prior to early boot stage.	Hemp sesbania	Add a nonionic surfactant at 0.25% v/v. Do not mix Ultra Blazer with oils, drift control agents, liquid fertilizers or other pesticides. See label for other restrictions.
bensulfuron — 0.038 to 0.06 lb/A	Londax 60 DF — 1 to 1.6 oz/A in 10 gal water for aerial application	Apply to flooded field preemergence to weeds or very early postemergence to submerged aquatic weeds. Redstem and yellow nutsedge should be 3 to 4 inches above water at application.	Aquatic weeds	Apply after flood establishment but before weeds reach the 3-leaf stage. Hold water static for at least 7 days after application. May be tank mixed with propanil 1-7 days preflood for increased yellow nutsedge and rice flatsedge control. See label for tank-mix rates. Add nonphytotoxic crop oil concentrate at 1% v/v or nonionic surfactant at 0.25% v/v if used alone or with a dry flowable herbicide.
bispyribac-sodium 0.034 lb/A	Regiment 80 WP — 0.67 oz/A	Postflood but before 0.5-inch internode elongation	Barnyardgrass, junglerice (4 tiller up to booting)	See label for list of adjuvants approved by Valent. **Avoid off-site movement to soybeans.**
cyhalofop-butyl 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	Postflood	Annual grasses	Soil moisture is critical for good activity. Tank-mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.** Add a nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre.
halosulfuron — 0.47 to 0.63 lb/A	Permit or Halomax 75 WG — 1 to 1.33 oz/A	Postflood to 48 days before harvest	Hemp sesbania, jointvetch, flatsedge	Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. Do not apply more than 1.3 ounces per acre in a season.
penoxsulam — 0.036 to 0.044 lb/A	Grasp 2 SC — 2.3 to 2.8 oz/A	Postflood to 60 days before harvest but before heading if targeting barnyardgrass	Barnyardgrass (prior to heading), hemp sesbania, jointvetch, flatsedge, and duck-salad	**Emergency salvage treatment.** Regrowth of treated weeds may occur. Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
propanil + triclopyr — 2 to 3 lb/A + 0.25 to 0.38 lb/A	propanil — 2 to 3 qt/A of 4 lb/gal formulation + Grandstand 3 SL — 0.67 to 1 pt/A	Postflood before 0.5-inch internode elongation	Broadleaf weeds, including hemp sesbania less than 5 feet tall	See *General Instructions and Remarks for Propanil*. See *Special Instructions and Remarks* for Grandstand. Consult propanil label concerning adjuvant use. Floodwater should cover the soil surface and root area of treated plants.
2,4-D amine 1 to 1.5 lb/A	Various formulations — 2 to 3 pt/A	Late tillering stage but before first elongating internode exceeds 0.5 inch in length.	Hemp sesbania, curly indigo, redstem, duck-salad, gooseweed, smartweed, spikerush, umbrellasedge, water hyacinth, morningglory, and dayflower.	Follow Division of Plant Industry regulations for phenoxy herbicides. Add 1 pint of surfactant to each 50 gallons of spray mix. Fields should have shallow flood at time of treatment. Do not apply nitrogen within 5- to 21-day period before treatment. Use extreme caution to prevent drift to susceptible crops.

Rice, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preharvest				
carfentrazone — 0.025 lb/A	Aim 2 EC — 1.5 oz/A	Rice moisture content is ≤25%	Morningglory	Aim labeling requires application at least 3 days before harvest.
Sodium chlorate at 4.5 lb/A	1.5 gal of a 3 lb/gal formulation in 10 gal spray solution per acre	Apply 7 days before harvest	Desiccation of weeds and "down" rice	Allow 7 days between application and harvest.

RED RICE CONTROL. Steps should be taken to prevent the introduction of this weed into rice fields. These steps include use of rice seed free of red rice, cleaning equipment before entering uninfested fields, and hand roguing of light infestations. Where severe infestations occur, several cycles of a 2-year soybean or a 1-year sorghum/1-year soybean rotation with rice are suggested. During the years out of rice, strive for 100% red rice control. Use a combination of preemergence and postemergence herbicides recommended for the control of red rice (see soybean section). A combination of shallow spring and fall disking in conjunction with clod disruption also should be used to reduce the soil reserves of red rice by stimulating germination and destroying germinated seed. When rice is planted, an early-season variety should be used. It should be planted late to allow for additional spring tillage and seeded at a rate that allows a good competitive stand. The early-season varieties mature earlier, thereby limiting the amount of red rice that shatters before harvesting as well as extending the time interval for additional fall tillage.

SORGHUM

(Forage, Grain)

ESTIMATED WEED CONTROL RATINGS OF HERBICIDES

Ratings 0-3 4-6 7-8 9-10	Expected Control slight fair good excellent	Application Method	Crabgrass	Goosegrass	Signalgrass	Seedling johnsongrass	Fall panicum	Pigweed	Cocklebur	Morningglory	Prickly sida	Sicklepod	Hemp sesbania	Lambsquarter	Crop Tolerance
Dual*		pre	9	9	7	8	9	8	0	0	4	5	2	6	G
Bicep*		pre	9	9	8	8	8	9	6	6	8	6	6	9	G
atrazine		pre	9	6	5	4	4	9	9	8	8	8	7	9	F
Outlook		pre	9	9	9	7	8	9	0	6	6	-	-	8	G
Permit		post	3	3	3	3	3	8	9	5	7	4	4	5	G
atrazine		post	7	5	6	3	4	8	9	8	8	7	6	8	G
atrazine + oil		post	8	6	7	3	5	9	9	8	9	8	7	9	F
2,4-D		post	0	1	0	0	2	9	9	9	8	8	9	9	F
bentazon**		post	0	0	0	0	0	5	9	2-9	8	0	4	7	G
paraquat***		post	8	8	8	8	8	8	5	5	6	9	2	7	F
Peak		post	0	0	0	0	0	9	9	8	9	8	8	8	G
linuron		post	8	7	8	6	8	8	7	8	8	8	8	9	F

*Sorghum seed must be treated with seed protectant to prevent damage from alachlor, metolachlor (Dual, Bicep) or dimethenamid - P (Outlook)

**Control of morningglory varies among species.

***Small weeds

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
paraquat at 0.5 to 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	Before sorghum emerges.	Most small emerged annual weeds.	Use higher rates as weed size increases. Do not make more than two applications.
glyphosate at 0.375 to 1.5 lb/A ae	See glyphosate table on pages 5-6 for rates.	Preplant for vegetation knockdown.	Consult label for list of weeds controlled.	Refer to the glyphosate formulation table on page 5 for surfactant/adjuvant recommendations for specific glyphosate formulations.
saflufenacil at 0.02 to 0.04 lb	2.85 lb/gal - Sharpen — 1 to 2 oz with 5 gal or more by ground or 3 or more gal by air. Add MSO adjuvant 1% v/v + AMS at 1% to 2% v/v. Consult label.	Preplant or preemergence check label.	Small, actively growing broadleaf weeds and preemergence activity on broadleaf weeds. Consult label for specific weeds.	Rainfall is required to activate this herbicide. Do not apply to emerged sorghum. Consult label for crop rotational intervals and Sharpen tank-mix partners. The use of Sharpen with Gramoxone at high temperatures may result in reduced Sharpen activity.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preemergence				
acetochlor at 1.35 to 2.5 lb + atrazine at 0.67 to 1.24 lb/A	4.04 lb/gal - Degree Xtra — 2 to 3.7 qt/A in 10 gal or more by ground.	Preemergence at planting.	Annual grasses and broadleaf weeds. Consult label for specific weeds.	**Apply only to grain sorghum planted with seed treated with a seed protectant or safener.** Rates should be based on soil texture and tolerance of sorghum hybrid. Consult label for crop rotation restriction and soil texture rate. Do not exceed 2.5 pounds per acre of atrazine per year. For grain sorghum forage use, allow a 60-day preharvest interval.
halsulfuron + dicamba at 0.03125 to 0.04688 lb/A + 0.138 to 0.206 lb/A	Yukon WSG — 4 to 6 oz in 10 gal or more by ground or 5 to 15 gal by air. Add NIS at 0.25% to 0.5% v/v or COC at 1% v/v.	Postemergence 2-leaf to 15-inch-tall grain sorghum (milo). Use drop nozzles if sorghum is taller than 8 inches.	Small broadleaf weeds. With ALS-resistant weeds, reduced control may occur.	Best performance is obtained when applied to 3- to 5-leaf sorghum and weeds are small. Apply as a single application with the total application rate not to exceed 6 ounces per season. Do not graze or feed treated sorghum forage or silage for 30 days after treatment. Do not apply to sorghum for seed production. Consult label for tank-mix partners and crop rotation restrictions. If stress conditions occur after application, temporary stature reduction may occur.
metolachlor at 1.5 to 2 to 2.5 lb/A or 0.95 to 1.43 to 1.59 lb/A	Dual Magnum 7.62 or Dual II Magnum 7.64 lb/gal 1 to 1.5 to 1.67 pt in 10 gal or more water by ground or 2 gal or more water by air. See table (page 3) to calculate band rate.	At planting.	Most annual grasses and small-seeded broadleaf weeds.	Apply only when the sorghum seed has been properly treated with Concep or Screen seed protectant. See label for rotation restrictions.
s-metolachlor at 1.31 lb + atrazine at 1.31 lb + mesotrione at 0.168 lb/A	3.66 lb/gal - Lexar — 3 qt in 10 gal or more by ground application.	At planting or up to 21 days before planting.	Most annual grasses and broadleaf weeds.	**Sorghum seed must be treated with Concept III safener before planting.** Base use rate on soil texture (consult label). Applying Lexar more than 7 days before planting reduces risk of crop injury. A split application of 50% applied 7 to 21 days before planting and 50% applied preemergence may be used. Do not apply more than 3 quarts per growing season. If weeds are present at application, add NIS (0.25% v/v) or COC (1% v/v) and spray grade UAN (2.5%) or AMS (8.5 pounds per 100 gallons). Do not apply to sandy soils (sand, sandy loam, or loamy sandy). Do not apply to emerged sorghum. Do not use in production of forage sorghum, sudangrass, sorghum-sudangrass hybrids, or dual-purpose
metolachlor at 1.5 to 2 or 0.95 to 1.43 + atrazine at 1.2 to 1.6 lb/A	Dual Magnum 7.62 or Dual II Magnum 7.64 lb/gal at 0.95 to 1.43 pt + atrazine at 1.2 to 1.6 qt of 4L formulation or 1.5 to 2.5 lb of 80% WP formulation or 1.3 to 2.2 lb of 90% WDG in a minimum of 10 gal water. See table (page 3) to calculate band rate.	At planting.	Most annual grasses and broadleaf weeds.	Use with sorghum seed properly treated with Concep or Screen seed protectant. Do not use on sand, loamy sand, or sandy loam. On medium to fine-textured soils with 1% to 1.5% organic matter, use low rate; above 1.5% organic matter, use high rate. Do not use on any soil with less than 1% organic matter.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
atrazine at 1.6 lb/A	3.2 pt of a 4 lb/gal or 2 lb of 80% wettable powder or 1.78 lb of 90% WDG in a minimum of 10 gal of water for ground application and 3 gal for aerial application. See table (page 3) to calculate band rate.	At planting.	Most annual grasses (except signalgrass) and broadleaf weeds.	Do not use on sand, loamy sand, or sandy loam or any soil with less than 1% organic matter. On soil containing 1% to 1.5% organic matter, use low rate; on soil with over 1.5% organic matter, use high rate. Do not plant crops other than corn or sorghum until the year after treatment. If treatment is made after June 10 crops other than corn or sorghum should not be planted the following year. Do not graze or feed forage from treated areas for 21 days following application. Thorough soil tillage after harvest minimizes the possibility for crop injury the following year. Do not exceed 2 pounds of active ingredient per acre per year.
dimethenamid - P at 0.75 to 0.94 lb/A	Outlook 6EC — 16 to 20 oz in 2 or more gal by air or 5 or more gal by ground.	At planting.	Annual grasses and small-seeded annual broadleaf weeds.	**Do not use on forage sorghum.** Apply only to sorghum planted with seed treated with a chloroacetamide herbicide safener. See label for tank-mix applications and for restrictions.
Postemergence				
acetechlor at 1.35 to 2.5 lb + atrazine at 0.67 to 1.24 lb/A	4.04 lb/gal - Degree Xtra — 2 to 3.7 qt in 10 gal or more by ground.	Postemergence — surface apply before crop exceeds 11 inches.	Annual grasses and broadleaf weeds.	Check the label for appropriate rates based on soil texture and organic matter. Do not exceed 2.5 pounds per acre of atrazine per year. For grain sorghum forage use, allow a 60-day preharvest interval. Check the label for crop rotation restrictions.
2,4-D amine at 0.3 to 0.5 lb/A; 2, 4-D acid at 0.1 to 1 lb/A	2,4-D amine — 0.66 to 1 pt of 3.8 lb/gal formulation; 2,4-D acid at 0.5 to 4.5 pt of 1.74 lb/gal formulation.	**Consult label for sorghum application growth stage, rate, time, and application method.**	Small broadleaf weeds.	Do not treat during boot, flower, or dough stage. One application per season. Do not feed or harvest within 30 days of application.
atrazine at 2 lb/A	atrazine — 4 pt of a 4 lb/gal or 2.5 lb of 80% WP or 2.22 lb of 90% WDG in a minimum of 10 gal of water for ground application and 3 gal for aerial application. See table (page 3) to calculate band rate.	After sorghum is completely emerged but before 12 inches tall and before weeds are over 1.5 inches tall.	Most annual grasses and broadleaf weeds.	Do not exceed 2 pounds of active ingredient per acre per year. Do not use on sand or sandy loam soils. Do not use when sorghum is under stress or crop is wet and succulent from recent rainfall. Do not graze or feed forage for 21 days after application. If applied after June 10, do not plant with crops other than corn or sorghum the following year. See label for restrictions.
atrazine at 1.2 lb/A + crop oil concentrate	atrazine — 2.4 pt of a 4 lb/gal or 1.5 lb of an 80% WP or 1.3 lb of 90% WDG + 1 qt crop oil concentrate in a minimum of 10 gal water per acre by ground. See table (page 3) to calculate band rate.	Sorghum 4 to 12 inches tall.	Same as atrazine at 2 lb/A.	Same as atrazine at 2 pounds per acre. Be sure oil is not contaminated or crop injury may result. Do not exceed 2 pounds of active ingredient per acre per year. See label for restrictions.

Sorghum (Forage, Grain), Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
linuron at 0.5-1 lb/A	1 to 2 pt Linex 4L. Add 2 pt surfactant to each 50 gal spray. Apply in 20 to 30 gal water per acre. See table (page 3) to calculate band rates.	Apply a single application as a directed spray to 12- to 15-inch sorghum. Apply when weeds are 2 to 4 inches tall.	Most annual grasses and broadleaf weeds that are actively growing and are 2 to 4 inches tall.	Use shields and/or gauge wheels to accurately direct the spray to the base of the sorghum. Keep spray off the upper leaves and whorl of sorghum. Use the low rate on small sorghum and 2-inch weeds. Use the high rate for large sorghum and 2- to 4-inch weeds. Keep spray pressure low to prevent injury to sorghum. Do not graze or feed plants to livestock within 3 months after application. Do not apply within 15 days of harvest.
bentazon at 0.5 to 1 lb/A	1 to 2 pt Basagran 4E in 20 gal water over-the-top or directed spray.	After sorghum has completely emerged but before boot.	Cocklebur, small prickly sida, smartweed, and ragweed.	Particularly useful where 2,4-D cannot be used because of nearby sensitive crops. Use low rate for up to 4-leaf cocklebur and stage when weeds are small and actively growing and high rate for 6- to 10-leaf cocklebur and other broadleaf weeds. Control may be poor if applied under drought stress. Rainfall after application may reduce effectiveness. Crop oil concentrate or surfactant may be used in accordance with label.
halosulfuron at 0.032 lb/A	Permit 75DF — 0.67 oz in 10 or more gal/A spray solution. Add 1 pt surfactant or 4 pt crop oil for each 50 gal spray.	Over the top to sorghum from 2-leaf to head emergence.	Annual broadleaf weeds and nutsedge suppression.	See the label for tank mixture with atrazine, Banvel, or 2,4-D and for restrictions.
prosulfuron at 0.43 or 0.57 lb/A	Peak 57 WDG 0.75 or 1 oz in a minimum of 2 gal of water by air or 10 gal by ground. Add 1 pt nonionic surfactant for each 50 gal spray mix.	Over the top when sorghum is 5 to 30 inches tall.	Most annual broadleaf weeds.	DO NOT USE ON FORAGE SORGHUM. See label for rate to use on weed height. Improved weed coverage with directed/semi-directed application to sorghum 20 inches or taller. See label for tank mixtures with atrazine, dicamba, or 2,4-D using 0.5 or 0.75 ounce per acre. See label for restrictions. Plant only STS soybeans the year following application; apply only the low rate if cotton will be planted the year following application; allow 10 months between application and planting for both cotton and soybeans.
quinclorac + atrazine at 0.25 to 0.375 lb/A + 0.5 to 1 lb/A	Paramount — 5.3 to 8 oz/A + atrazine (0.5 to 1 lb ai/A). Add methylated seed oil (MSO) (preferred additive) or crop oil concentrate (COC) at 1 qt/A.	Preemergence to early postemergence (12-inch-tall sorghum).	Annual grasses and broadleaf weeds.	Apply when weeds are less than 2 inches tall. Do not use liquid fertilizer as a carrier.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
For Use Under Hooded Sprayer				
paraquat at 0.25 to 0.50 lb/A	Several formulations. Consult label for rates. Apply in 10 gal or more water plus 2 pt nonionic surfactant per 100 gal mix.	After sorghum is 12 inches tall.	Small annual grasses and weeds.	**For hooded or shielded sprayers:** To avoid excessive crop injury, use a hooded or shielded sprayer with skids or wheels on the spray boom. Apply by directing sprayer between the rows and use the hooded or shielded sprayer to prevent spray contact with the plant. **Without hooded or shielded sprayers:** Do not exceed 30 psi. Use precision direct spray application equipment adjusted so no more than the lower 3 inches of each plant is sprayed. Some crop injury will occur. Do not spray during windy conditions.
carfentrazone at 0.008 to 0.016 lb/A	2 EC AIM — 0.5 to 1 oz/A in at least 10 gal/A water. Add nonionic surfactant at 2 pt per 100 gal mix.	See special instructions.	Morningglories, pigweed, waterhemp, and velvetleaf.	Apply AIM to row middles of emerged crop with a **hooded sprayer**. Hooded sprayers must be designed, adjusted, and operated in such a manner as to totally enclose the spray pattern and prevent any spray deposition to the green stem tissue or foliage of the crop. Base application rate on weed size. See the label.
At Harvest for Weeds				
carfentrazone at 0.016 to 0.031 lb/A	Aim EC — 1 to 2 oz/A. Apply in at least 10 gal water by ground or 5 gal water by air. Add 1% v/v crop oil concentrate.	After grain is fully mature, when black layer has formed and kernels hard.	Morningglory and other broadleaf weed desiccation.	Do not apply within three days of harvest.
glyphosate at 0.75 to 7.5 lb/A ae	See table on pages 5-6 for glyphosate rates.	After grain reaches 30% moisture or less and kernel black layer has formed; at least 7 days before harvest.	Johnsongrass, other susceptible weeds, and desiccation of green vegetation.	Allow a minimum of 7 days before harvest or grazing.
sodium chlorate at 6 lb/A	1 gal of 6 lb/gal or 2 gal of 3 lb/gal in 15 to 20 gal water by ground or 5 gal by air. Add 2 pt surfactant per 50 gal mix for aerial and 1 pt surfactant per 50 gal mix for ground application.	After sorghum grain has 25% or less moisture.	Grasses.	Apply on a bright sunny day when air temperature is above 85 degrees and relative humidity is below 65%. Broadleaf weeds may be defoliated but there will be little desiccation.

SMALL GRAINS

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
paraquat at 0.5 to 0.75 lb/A	2.0 EC - Gramoxone Inteon — 32 to 64 oz in a minimum of 10 gal by ground or 5 gal by air. Add NIS at 1 to 2 pt per 100 gal.	Before small grains (wheat, barley, oats, rye, and triticale) emerge.	Most small, emerged annual weeds.	Apply as a broadcast spray. Use 32 ounces when applying to 1- to 3-inch weeds and 64 ounces to 6-inch or larger weeds. Do not apply under windy conditions or graze or feed treated forage to livestock. See the label for tank mixtures with Hoelon (wheat only).
glyphosate at 0.375 to 1.5 lb ae	See glyphosate table on pages 5-6 for rates.	Preplant for vegetation knockdown.	Consult label for list of weeds controlled.	Refer to the glyphosate formulation table on page 5 for surfactant/adjuvant recommendations for specific glyphosate formulations.
saflufenacil at 0.02 to 0.04 lb	2.85 lb/gal - Sharpen — 1 to 2 oz. in 5 or more gal by ground or 3 or more gal by air. Add MSO at 1% v/v (1 gal per 100 gal) plus AMS at 8.5 to 17 lb per 100 gal.	Preplant or preemergence check label.	Small, actively growing broadleaf weeds and preemergence activity on broadleaf weeds. Consult label for specific weeds.	Rainfall is required to activate this herbicide as a preemergence treatment. Use only with drill-planting method. Do not apply to emerged small grain. Broad-spectrum burndown control of grasses or broadleaf weeds usually requires a tank-mix partner with Sharpen. Consult the label for crop rotational intervals and Sharpen tank-mix partners. Small grain forage or hay can be fed or grazed 30 days after application.
Preemergence — *Wheat*				
diclofop methyl at 0.75 to 1 lb/A	2 to 2.67 pt of Hoelon 3 EC in at least 10 gal water for ground and 5 gal water for air.	After seeding.	Annual ryegrass.	**Do not** apply preemergence to other small grains. In coarse-textured soils with less than 2% organic matter use the low rate. Use the higher rate for fine-textured soils with more than 2% organic matter. Use high rate if ryegrass pressure is heavy irrespective of soil type or organic matter. See postemergence Hoelon entry below for additional restrictions.
Preemergence — *Wheat or Barley*				
chlorsulfuron + metsulfuron at 0.017 to 0.042 lb/A	Finesse — 0.2 to 0.5 oz/A.	Apply after planting but before wheat emerges.	Broadleaf weeds, and annual bluegrass and ryegrass at the 0.5 oz/A rate.	Finesse should not be used on soils with a pH above 7.9. Minimum rotational cropping interval for STS soybeans is 6 months; non-STS soybeans, corn, sorghum, and cotton require 18 months. The 0.5-ounce-per-acre rate is necessary for annual bluegrass and ryegrass activity, and it may be improved with a sequential application of metribuzin. Wheat seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence **—** *Wheat, Oats, Barley, or Rye*				
2,4-D amine at 0.48 to 0.96 lb/A; LV esters at 0.21 to 0.5 lb/A; or 2,4-D acid formulation at 0.21 to 0.7 lb/A	2,4-D amine — 1 to 2 pt of 3.8 lb/gal formulation; 2,4-D acid — 1 to 3.25 pt/A of 1.74 lb/gal formulation; LV esters — 0.5 to 1 pt/A of 4 lb/gal formulation; 6 to 13 oz/A of 4.7 lb/gal acid formulation.	After wheat is fully tillered, until stem elongation begins — Feekes Stages 3 to 5 (usually 4- to 8-inch-tall wheat). **Check the labels for rates and application stage.**	Wild mustards, vetch, buttercup, and pepperweed. Poor control of wild garlic, henbit, and curly dock.	Apply to emerged and actively growing weeds. This treatment may be applied in combination with liquid nitrogen fertilizer. Oats are less tolerant of 2,4-D than wheat. Do not apply when grains are in boot to dough stage.
dicamba + 2,4-D at 0.125 + 0.50 lb/A	Clarity — 0.25 pt. plus 1 pt (4 lb/gal formulation) of 2,4-D amine or low-volatile ester in 5 gal water for air and in 10 to 20 gal water for ground application. Add 1 pt surfactant for each 50 gal spray mix.	Same as above.	Same as above. Garlic and/or onions.	Same as above. The low-volatile ester formulation should be used where wild garlic and/or onions are a problem. See the label for injury precautions and grazing restrictions for lactating dairy cows.
2,4-D acid + dicamba acid at 0.13 + 0.3 lb/A	Latigo at 1 pt/A of 1.8 lb/gal dicamba acid + 2.4 lb/gal 2,4-D acid formulation.	Same as above.	Same as above.	**Consult label for application instructions, injury precautions, and grazing restrictions.**
Postemergence **—** *Wheat*				
chlorsulfuron + flucarbazone at 0.027 to 0.040 lb/A	Finesse Grass & Broadleaf — 0.6 to 0.9 oz/A. Add 0.25% nonionic surfactant, unless liquid N comprises at least 50% of the spray volume.	After wheat has 2 leaves but before jointing. After weed emergence.	Many annual broadleaf and grass weed species.	Finesse grass and broadleaf should not be used on soils with a pH above 7.9. The minimum rotational cropping interval for STS soybeans is 6 months under any soil pH; all field corn with soil pH 7.5 or lower can be recropped at 14 months. Unless a crop rotation interval is specified, a field bioassay must be completed (see label for specific directions). Treated wheat fields may be grazed at any time. Note: for best results, apply 5 to 7 days before grazing.
diclofop methyl at 0.5 to 1 lb/A	1.33 to 2.67 pt Hoelon 3EC in at least 10 gal water and a minimum of 40 psi for ground; 5 gal water by air. Surfactant not needed.	When ryegrass is in the 1-leaf to 2-tiller stage.	Annual ryegrass.	If ryegrass is in the 5-leaf to 2-tiller stage, use high rate. **Do not** mix with other pesticides or liquid fertilizer. **Do not** graze treated fields or feed treated forage to livestock. Broadleaf herbicides should not be applied within one week of Hoelon application. **Do not** make more than 1 application per season. Activity is slow. **Do not** make aerial application when wind is above 5 mph or within 100 feet of lake, pond, stream, drainage basin, or tidal marsh.
flufenacet + metribuzin at 0.136 to 0.34 + 0.034 to 0.085 lb/A	Axiom DF — 4 to 10 oz/A depending upon soil texture.	After wheat has emerged from spiking to 2-leaf stage.	Many annual broadleaf weeds, annual bluegrass, and ryegrass.	Wheat seed must be planted 1 to 2 inches deep (generally best achieved by drill-planting, rather than broadcast seeding methods). Axiom must be applied preemergence to weeds. Apply as a broadcast spray by ground equipment at 10 or more gal per acre. Do not add COC or other oil-based adjuvants with tank mixtures. Do not allow animal grazing for 30 days after application.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
mesosulfuron-methyl at 0.013 lb/A	Osprey - 4.75 oz/A in at least 10 gal/A of water by ground or 5 gal/A of water by air.	From wheat emergence through jointing. Ryegrass control normally best with fall application.	Annual ryegrass, annual bluegrass.	For best ryegrass control, apply on 1-leaf- to 2-tiller-stage ryegrass, when it is actively growing. Application of Osprey must include one of these two suggested adjuvant systems: (1) a high-quality MSO with 10% emulsifier or greater at a rate of 1.3 to 1.5 pints of MSO per acre; or (2) a nonionic surfactant at 0.5% v/v, plus either AMS (1.5 to 3 pounds per acre) or UAN (1–2 quarts per acre). Wheat injury may occur if topdress nitrogen is applied within 14 days of Osprey application. Do not apply within 30 days of forage harvest or within 60 days of hay, grain, and straw harvest.
metribuzin at 0.094 to 0.141 lb/A	Sencor DF 75% — 2 to 3 oz/A.	During the fall when wheat is actively growing and has at least 2 leaves and 1-inch secondary roots.	Annual bluegrass and annual broadleaf species.	Crop tolerance to Sencor may vary depending upon variety and wheat health and root development. Wheat seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury. Do not use on soils with less than 0.75% organic matter. Do not use COC or any adjuvant containing vegetable or petroleum oils. Do not apply in combination with fluid fertilizer.
pendimethalin at 0.71 to 1.43 lb/A	Prowl H2O — 1.5 to 3 pt/A. Rate is dependent upon soil texture. Apply no more than 2 pt/A on coarse-textured soils; 2 to 3 pt/A may be used on fine-textured (clay) soils.	After wheat is in the 1-leaf stage but before the flag leaf is visible. **Must be applied before weed emergence.**	Ryegrass and other small-seeded annual grasses and broadleafs.	Wheat seed should be planted at least 0.5 to 1 inch deep to avoid crop injury. Thus, application should generally be restricted to drill-planted wheat, seeded deeper than the specified depth. To control emerged weeds, Prowl H2O may be tank-mixed with postemergence herbicides registered for use in wheat. Prowl H2O will only provide residual weed control. Plant residue may inhibit weed control, so only use in prepared (tilled) seedbeds. Do not apply Prowl H2O within 11 days of wheat harvest for forage, 28 days for hay harvest, and 60 days for grain or straw harvest.
pyroxsulam HL at 0.26 lb/A	13% — PowerFlex HL at 2 oz/A in 10 gal or more by ground, or 5 gal or more by air. Add 0.25% nonionic surfactant with at least 80% active ingredient.	Apply in the fall or spring from 3-leaf to joint stage of actively growing wheat. Apply when grass weeds are at the 2-leaf to 2-tiller stage and before broadleaf weeds are taller than 2 inches or 2 inches in diameter.	Ryegrass and many annual grass and broadleaf weed species.	Do not tank-mix with dicamba or amine formulations of 2,4-D, MCPA, or organophosphate insecticides. Do not apply organophosphate products for 5 days before or 5 days after application. Do not use on wheat varieties sensitive to ALS herbicides. **Consult label for specific instructions on crop rotation restrictions, tank mix compatibility, tank cleanout, application with liquid N fertilizer, and harvest and grazing intervals.**

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast	Time of application	Weeds controlled	Special instructions and remarks
Postemergence **—** *Wheat and Barley*				
pinoxaden at 0.053 lb/A	Axial XL — 16.4 oz/A. Surfactant is included.	Apply from 2-leaf to pre-boot stage wheat. Apply to 1-leaf to 2-tiller stage ryegrass.	Ryegrass and oats.	Additional surfactant is not required. For best control, apply to small, actively growing ryegrass. Axial XL may be mixed in a spray solution containing up to 50% nitrogen fertilizer. Only one application is allowed per crop season. Do not graze or harvest forage for hay for 30 days after application. Do not harvest for grain or straw for livestock feed within 60 days of application.
Postemergence **—** *Wheat, Oats, Rye*				
prosulfuron at 0.0178 lb/A	Peak 57 WDG — 0.5 oz/A in a minimum of 2 gal of water by air or 10 gal by ground. Add 1 pt nonionic surfactant for each 50 gal spray mix.	Over-the-top to wheat or oats from 3-leaf to internode elongation.	Most winter annual broadleafs, garlic.	See label for rate to use on weed height. See label for tank mixtures with dicamba. See label for restrictions. **Do not** plant cotton or non-STS soybeans for 10 months after application. Do not graze or feed forage for 30 days after application. Do not harvest for grain and silage for 60 and 40 days after application, respectively.
Postemergence **—** *Wheat, Oats, Triticale, or Barley*				
thifensulfuron + tribenuron at 0.014 to 0.028 lb/A	Harmony Extra SG with TotalSol — 0.45 to 0.9 oz/A. On oats, use 0.45 to 0.6 oz/A. Add 0.25% nonionic surfactant unless liquid N comprises at least 50% of the spray volume.	After the crop is in the 2-leaf stage but before the flag leaf is visible.	Winter annual broadleafs, wild garlic, and curly dock.	Apply to actively growing annual broadleaf weeds less than 4 inches tall or wide. For wild garlic control, use 0.75 to 0.9 ounces per acre when weeds are less than 12 inches tall with 2 to 4 inches of new growth. Wild garlic subjected to cold weather or stress will be more difficult to control. Two applications may be made per crop season provided the total amount does not exceed 1.5 ounces per acre. Allow at least 7 days between application and grazing or feeding forage to livestock, 30 days for feeding hay to livestock, and 45 days for grain harvest.
Preharvest **—** *Wheat*				
glyphosate at 0.37 to 0.75 lb/A	Several formulations. Consult label for specific use rates. Apply in 10 gal water or more by ground and 3 to 10 gal water by air.	After wheat has 30% or less moisture and at least 7 days before harvest.	Annual broadleaf and grass weeds, johnsongrass, marestail.	**Do not** use on wheat grown for seed. Avoid drift to nearby crops that are not Roundup resistant.

PEANUTS

Cultivation is often justified as a supplement to chemical weed control. However, haphazard cultivation that disturbs the developing pegs or throws soil on the plant will reduce yield and quality. Southern blight (white mold) is often more severe following such practices. Precision cultivation is recommended using flat sweeps set to run shallow in the middle. The use of fenders or shields to prevent soil movement onto the plants is a good practice. Rolling cultivators also can be used effectively, but gangs should be set for minimum soil shifting. Positive depth and lateral control of all cultivating equipment is recommended.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
ethalfluralin	Sonalan 3EC — 1.5 to 3 pt in 10 to 20 gal water	Up to 3 weeks prior to planting.	Most annual grasses and many small-seeded annual broadleafs.	Mix uniformly with the top 2- to 3-inch depth soon after application. Bedding must not expose untreated soil. Use low rate for coarse soils and high rate for clay soils.
glyphosate at 0.375 to 1.5 lb acid equivalent	Several formulations. Consult label for specific use rates. Apply in 10 to 20 gal water by ground or 5 gal water by air.	Preplant to before crop emergence. Severe crop injury may result for applications made to emerging plants.	Several winter and summer annual, biennial, and perennial broadleaf weeds.	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. **Avoid drift to nontarget species or areas**. Do not use with galvanized (zinc-coated) spray equipment.
paraquat at 0.5 to 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	Preplant up to planting. (See specific instructions.)	Various winter and summer annual weeds.	Use higher rates as weed size increases. Do not make more than two applications.
Preplant or Preemergence				
diclosulan at 0.024	Strongarm 84 WG — 0.45 oz in 10 to 20 gal water	For preplant incorporation, apply to a seedbed that is relatively free of clods. For optimum results, apply Strongarm just before planting, before germination of weeds, and before emergence of the crop.	Provides general broadleaf weed control.	Incorporate into the top 1 to 3 inches of the final seedbed, using equipment that thoroughly mixes the soil. If surface-applied, at least 0.25-0.5 inches of supplemental moisture is needed to move Stongarm into the soil where weed germination occurs. Tank mix with grass herbicide. It offers poor control of sicklepod. Nutsedge control has been variable and inconsistent. Seed label for complete rotation restrictions: cotton=10 months; corn=18 months (10 months-IR hybrids); and soybeans=0 months.
imazethapyr at 0.063 lb/A	Pursuit — 4 fl oz (may be split 2 oz ppi or pre + 2 oz post). Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant	Preplant incorporated, preemergence, or split with post application.	Several broadleaf weeds and annual grasses, and yellow and purple nutsedge suppression.	Do not apply more than 4 fluid ounces per acre per season. Do not graze or feed treated forage to livestock. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Peanuts, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
metolachlor at 2 to 2.5 lb/A	Dual Magnum — 1.6 to 2 pt in 10 to 20 gal water	For **preplant incorporation,** apply within 14 days of plant ing. For **preemergence** (surface application), apply at planting or after but before emergence of weeds or crop.	Most annual grasses, yellow nutsedge, and pigweed.	Incorporation should place the herbicide no deeper than 2 inches. If a dry period follows surface application, a shallow incorporation may be beneficial before peanuts emerge. Rainfall is required to activate surface-applied herbicides. Optimum control is obtained when rainfall occurs within 10 days after application.
pendimethalin at 1 lb/A	Several formulations. Consult label for specific use rates. Apply in at least 10 gal water by ground or 5 gal water by air.	60 days preplant up to 2 days after planting. (See specific instructions.)	Most annual grasses and some small-seeded broadleaf weeds such as pigweed and purslane.	Incorporate 1 to 2 inches deep. To prevent decreased pegging, adequate incorporation via equipment, overhead irrigation, or rainfall must occur within 48 hours of application.
sulfentrazone + carfentrazone at 0.074 + 0.008 to 0.17 + 0.02 lb/A	Spartan Charge — 3 to 7 fl oz. Apply in at least 10 gal water by ground or 5 gal water by air.	Preplant and preemergence up to 3 days after planting. (See specific instructions.)	Residual activity on nutsedge. Controls pigweed and morningglory, as well as many other summer annual broadleaf species.	Do not apply more than 7 fluid ounces per acre per 12-month period. Peanut chlorosis and stunting may occur at pH 7.0 and above, as well as under cold and wet growing conditions. Do not use on soils classified as sand, which have less than 1% organic matter. Do not irrigate when peanuts are cracking.
Preemergence				
alachlor at 2 lb/A	Lasso 4EC — 2 qt in 10 to 20 gal water by ground	At planting or after but before emergence of weeds or crop.	Most annual grasses and small-seeded broadleaf weeds such as pigweed.	Rainfall is required to activate the herbicide; optimum control is obtained when rainfall occurs within 10 days after application. **Rates up to 4 pounds of active ingredient may be used for hard-to-control weeds as specified on the label; e.g., yellow nutsedge. See label for restrictions.**
Because of the potential for above tolerance levels of alachlor metabolites, certain peanut buyers may require certification of peanuts grown without Lasso. Peanut producers should consult with buyers prior to using Lasso.				
flumioxazin 0.096 lb/A	Valor 51WDG 3 oz in 10 to 20 gal water	Apply immediately after planting, but no later than 2 days after planing.	Small-seeded broadleafs such as pigweed, teaweed, eclipta, horseweed, Florida beggarweed, and tropic croton. Valor will not control annual/perennial grasses, sicklepod, nutsedge, and cocklebur	Apply immediately after planting but no later than 2 days after planting. **Do not** irrigate when peanuts are cracking. Rainfall or irrigation at cracking will cause temporary crop injury that should not result in reduced yields if applied according to the label.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
Overlays and Tank Mix Combinations For a broad spectrum of grasses and broadleaf weeds, use of a combination of herbicides may provide greater control than single materials. This may be accomplished through tank mixtures or overlays of a preemergence over a preplant herbicide. Where overlays or combinations are used, they should be applied according to the prescribed rate and manner indicated on the respective labels.				
Postemergence				
2,4-DB at 0.2 - 0.4 lb/A	0.9 to 1.75 pt of a 1.75 lb/gal formulation or 0.8 to 1.6 pt of a 2 lb/gal formulation in 10 to 20 gal water	Two to 12 weeks after planting. Do not apply within 30 days of harvest.	Cocklebur, annual morningglory, common ragweed, and sicklepod.	**Do not** make more than two applications per season. **Do not** apply to peanuts within 30 days of harvest. **Do not** feed treated vines or peanut hay to livestock. **Do not** apply to peanuts if suffering from lack of water.
	Check individual 2,4-DB labels for different use rates and restrictions.			
acifluorfen at 0.125 to 0.5 lb/A	Ultra Blazer 2L — 0.5 to 2 pt in 5 to 10 gal water by aerial or 20 gal water by ground equipment. Select rate based on table. Add 1 to 4 pt **nonionic surfactant** per 100 gal of spray mixture as per label.	When seedling weeds are in 2- to 4-leaf stage.	See Rate Table.	**Do not apply** to crop or weeds under stress from weather, pests or other herbicides. **Do not apply** within 75 days of harvest. **Do not apply** more than 2 pints per acre during the growing season. Rainfall received within 6 hours of application may reduce control. Avoid drift to other crops such as cotton. Apply at 40 to 60 psi to thoroughly cover weeds. **Do not use** treated plants for feed or forage.

Ultra Blazer Rate Table

Hemp sesbania	0.5-1.0 pt	Common ragweed	1.5 pt
Showy Crotolaria	1.0 pt	Cocklebur	2.0 pt
Purple moonflower	1.5 pt	Copperleaf, hophornbeam	2.0 pt
Pitted Morningglory	1.5 pt	Groundcherry, cutleaf	2.0 pt
Redroot pigweed	1.5 pt	Other morningglories	
Smooth pigweed	1.5 pt	than above	2.0 pt

bentazon at 0.5 to 0.75 to 1 lb/A	Basagran 4E — 1 to 1.5 to 2 pt in 20 gal of water	Early postemergence while weeds are small and actively growing. Use medium to high rate for 6- to 10-inch cocklebur and 3- to 4-inch prickly sida. Late Cocklebur Rescue Treatment: apply 1.5 pints per acre to cocklebur before blooming up to 24 inches tall and repeat in 10 to 14 days. Only partial control may be obtained.	Several broadleaf weeds including cocklebur and prickly sida. Little or no control of most morningglory species at these rates.	Thorough weed coverage is essential. For band applications, use at least two nozzles per row and preferably three nozzles. Use a minimum of 40 psi pressure. **Do not apply** if peanuts show prior herbicide damage or during periods of drought or cold weather stress. **Do not apply** more than 2 quarts per acre per season and **do not feed** treated peanut forage to livestock. Peanut hay may be fed.
bentazon + acifluorfen 0.75 lb/A	Storm 4EC — 1.5 pt in 20 gal by ground. 10 gal minimum by air. Add 1 pt of **crop oil concentrate** per acre. However, 0.125% **nonionic surfactant** per 100 gal may be substituted.	From cracking through two expanded trifoliate leaves.	Several broadleaf weeds including cocklebur, prickly sida, sesbania, and pigweed.	**Do not apply** Storm to peanuts that have been subject to stress conditions. **Do not apply** more than a total of 1.5 pints of Storm within 75 days of peanut harvest.

Peanuts, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
carfentrazone-ethyl	Aim EC — Up to 2 fl oz/A	Apply more than 7 days before harvest.	Troublesome weeds present at harvest.	**Do not** apply more than 2 ounces per acre as a harvest aid. Only rotate field to a carfentrazone-ethyl-registered crop.
clethodim at 0.094 to 0.125	Several formulations — 6 to 8 oz + 1 qt crop oil concentrate in 10 to 20 gal water	Use the low rate for small (< 4 inches tall) annual grasses and high rate for larger annual or perennial grasses or in heavy populations of annual grasses.	Most annual and perennial grasses.	Apply over the top of actively growing grasses. **Do not** apply (1) within 40 days of harvest, (2) more than 32 ounces per acre per season, (3) if rainfall is expected within 1 hour, or (4) to stressed plants.
diclosulan at 0.024	Strongarm 84 WG — 0.45 oz in 10 to 20 gal water	Apply up to 28 days after planting.	Tropical Spiderwort (*Commelina benghalensis*)	**Strongarm has a 24C label for control of tropical spiderwort in peanuts.** Apply when tropical spiderwort plants are small. Larger plants will be stunted, but will rarely die. Strongarm applied postemergence is also excellent on common ragweed, cocklebur, eclipta, bristly starbur, and wild radish, among other weeds.
imazapic at 0.5 to 1 lb/A	Cadre — 4 fl oz. Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant.	At crack to within 90 days of harvest.	Sicklepod, morningglories, pigweed, Florida beggarweed, common cocklebur and nutsedges.	Shallow cultivation may improve control of some species. Rainfall within 3 hours of application may reduce control. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.
imazethapyr at 0.063 lb/A	Pursuit — 4 fl oz (may be split 2 oz ppi or pre + 2 oz post). Apply in at least 10 gal water by ground or 5 gal water by air. Add 0.25% v/v 80% active nonionic surfactant	At crack or postemergence.	Several broadleaf weeds and annual grasses, and yellow and purple nutsedge suppression.	Do not apply more than 4 fluid ounces per acre per season. Do not graze or feed treated forage to livestock. **Rotation restrictions:** cotton and sorghum — 18 months; small grains — 4 months.
lactofen at 0.195 lb/A	Cobra 2EC — 12.5 oz	Apply after peanuts reach the 6-true-leaf stage.	Provides good control of pigweeds, morningglories, ragweed, copperleaf, wild poinsettia, and eclipta.	Use COC at 1% v/v. Preharvest interval is 90 days.
paraquat at 0.125 lb/A	Several formulations (3 lb/gal) — 5.4 fl oz Several formulations (2 lb/gal) — 8 fl oz	Apply at cracking or early postemergence up to 14 days after ground cracking. After that time, use in combination with Basagran or Storm.	Provides effective control of sicklepod, Florida beggarweed, Texas panicum, and many other problem weeds. When used alone, paraquat is not effective on smallflower morningglory, prickly sida, wild radish, or tropic croton.	Peanut foliage injury is usually temporary. Conditions of high humidity, wet foliage, and/or wet soils result in greater foliage burn. Thrips injury retards crop recovery.

Peanuts Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed to treat 1 acre broadcast (See table on page 3 for band rates)	Time of application	Weeds controlled	Special instructions and remarks
paraquat + bentazon 0.127 lb/A + 0.25 to 0.5 lb/A	Several paraquat formulations. Consult label for specific use rates. Basagran 0.5 pt to 1 pt. Apply in 20 gal water by ground. Add 0.125% v/v 80% active nonionic surfactant.	From cracking through 28 days after ground crack.	Small, emerged annual grasses and many broadleaf weeds.	**Do not apply** after flower initiation. **Do not make more than two applications per crop.** One pint of Basagran is needed for nutsedge control. Use 0.5 pint of Basagran if it is added only as a safener.
sethoxydim at 0.18 to 0.38 lb/A	Poast Plus 1E — 1.5 to 3 pt in 5 to 10 gal water by air or 5 to 20 gal water by ground. Always add a **crop oil concentrate** at 1 qt/A.	Apply to actively growing grasses.	Most annual grasses, seedling and rhizome johnsongrass, bermudagrass, and red rice.	Peanuts at all stages of growth are tolerant. Apply over the top of peanuts or as a semi-directed spray to the grasses. **Do not apply** (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after application; (3) within 40 days of harvest.

Grass	Growth Stage (inches)	Poast (oz/A)
Goosegrass and crabgrass	up to 6	24
Other annual grasses and seedling johnsongrass	up to 8	24
Rhizome johnsongrass	15 to 20	24
regrowth	6 to 12	24
Bermudagrass	stolons up to 6	36
regrowth	stolons 1 to 4	24
Red rice	up to 4	48

FORAGE CROPS

MSMA **is not** recommended nor labeled for application to bermudagrass or other forage grasses grown for livestock consumption.

REPLANTING RESTRICTIONS FOR FORAGES ***(See product labels for crops not listed.)***[1]

	Legumes		Pasture Grasses			
Product	Alfalfa	Clover	Bahia	Bermuda	Fescue	Rye
2,4-D+Dicamba+Metsulfuron at 0.25 oz/A plus 1 pt/A	4 m	4 m	-	4 m	4 m	4 m
2,4-D+Picloram	1 y	1 y	3 w	3 w	3 w	3 w
2,4-D+Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Chaparral	bioassay	bioassay	ns	ns	fall	ns
Cimarron Plus at 0.25 oz/A	4 m	4 m	-	4 m	4 m	4 m
Dicamba (per pint applied per acre)	120 d	120 d	30 d	30 d	30 d	30 d
Diuron	2 y	2 y	2 y	2 y	2 y	2 y
Glyphosate	1 w	1 w	1 w	1 w	1 w	1 w
Grazon Next	bioassay	bioassay	-	-	-	-
Imazapyr	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Lineage Clearstand	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Metsulfuron	bioassay	bioassay	ns	ns	fall	fall
Milestone	bioassay	bioassay	-	-	-	-
Maverick/Outrider	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Overdrive	30 d	30 d	30 d	30 d	30 d	30 d
Paraquat	0 d	0 d	0 d	0 d	0 d	0 d
Pastora	12 m	12 m	-	4 m	-	4 m
Pasturegard	1 m	1 m	3 w	3 w[2]	3 w	3 w
Pursuit	4 m	4 m	40 m	40 m	40 m	4 m
Redeem R&P	bioassay	bioassay	14 d	14 d	14 d	14 d
Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Surmount	bioassay	bioassay	12 m	12 m	12 m	12 m
Telar	bioassay	bioassay	bioassay	bioassay	bioassay	bioassay
Velpar	2 y	2 y	2 y	2 y	2 y	2 y

[1]D, m, w, and y following numbers in this table indicate days, months, weeks, and years, respectively.
[2]Interval applies to seeded bermudagrass cultivars.

WEED RESPONSE RATINGS FOR FORAGE HERBICIDES

Herbicides / Weeds	Bahiagrass	Bitterweed	Blackberry	Bulrush	Bullthistle	Buttercup	Chickweed	Cogongrass	Common Ragweed	Crabgrass	Curly Dock	Dogfennel	Eastern Red Cedar	Foxtail	Goldenrod	Groundsel	Henbit	Horsenettle	Horseweed	Johnsongrass	Lanceleaf Ragweed	Little Barley	Mullein	Multiflora Rose	Nutsedge	Osage Orange	Red Sorrel	Smartweed	Smooth Pigweed	Smutgrass	Tall Fescue	Tropical soda apple	Vaseygrass	Wild Garlic
Preplant Incorporated																																		
Benefin	N	N	N	N	N	N	H	N	R	H	N	N	N	H	N	N	R	N	N	N	N	R	N	N	N	N	N	R	H	N	N	N	N	N
Preemergence																																		
Diuron	N	H	N	-	N	H	H	N	H	H	N	N	-	H	N	N	H	N	H	N	N	H	N	N	N	N	R	H	H	N	N	N	N	N
Postemergence																																		
2,4-D amine	N	H	N	H	H	H	N	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	N	N	R*	N	R	R	N	N	N	N	N
2,4-D ester	N	H	N	R	H	H	R	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	R	N	R	N	R	R	N	N	N	N	R
2,4-DB	N	R	N	-	R	R	R	N	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
2,4-D+Dicamba	N	H	R	H	H	H	H	N	H	N	H	H	H	N	H	N	H	R	H	N	H	N	R	R	N	N	R	H	H	N	N	N	N	R
2,4-D+Picloram	N	H	R	H	H	H	R	N	R	N	H	H	H	N	H	R	R	R	H	N	R	N	R	R	N	H	H	H	H	N	N	R	N	R
2,4-D+Triclopyr	N	H	R	-	H	H	R	N	H	N	H	R	R	N	H	N	R	R	H	N	R	N	N	R	N	N	R	H	H	N	N	N	N	N
Buctril	N	N	N	-	N	R	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	R	N	N	N	N	N	N
Chaparral	N	N	H	N	R	H	R	N	R	N	R	N	R	N	H	-	R	R	R	N	R	N	N	R	N	-	R	R	H	N	N	H	N	R
Cimarron Max	H	H	H	R	H	H	H	N	H	N	H	H	H	N	H	H	H	R	H	N	H	N	H	H	N	N	H	H	H	N	R	N	N	H
Dicamba	N	H	R	N	H	H	H	N	H	N	H	H	R	N	H	N	H	R	H	N	R	N	N	R	N	R	H	H	H	N	N	N	N	N
Diuron	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	R	R	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	H	R	R	R	N	R	R	R	R	R	R	R	R	R	N	N	N	N	R	R	N	R	N	R	N	N	R	R	R	R	H	R	R	H
Grazon Next	N	R	R	-	R	R	R	-	R	N	R	N	-	N	R	N	R	R	R	N	R	N	-	N	N	N	N	-	-	N	N	N	N	N
Imazapyr	N	N	N	N	N	R	R	R	R	N	N	R	N	R	N	N	R	N	N	R	R	R	R	R	R	N	R	R	R	N	R	N	R	N
Maverick/Outrider	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	H	N	N	N	N	R	N	N	N	N	N	N	N	N	N
Metsulfuron	H	H	R	N	R	H	H	N	N	N	H	N	R	N	N	H	H	N	R	N	N	N	H	R	N	N	H	H	H	N	N	N	N	H
Milestone	N	R	N	N	R	R	-	N	R	N	R	N	N	N	-	-	R	R	R	N	R	N	-	N	N	N	-	R	-	N	N	H	N	N
Overdrive	N	R	N	N	R	H	R	N	R	N	R	R	N	N	R	N	R	N	R	N	R	N	N	N	N	N	R	R	R	N	N	N	N	R
Paraquat	N	N	N	N	N	H	H	N	R	N	N	N	N	H	N	N	H	N	N	-	N	H	N	N	-	N	N	N	N	N	H	N	-	H
Pastora	R	-	R	N	N	H	R	N	-	N	-	-	N	R	-	-	R	R	R	R	-	-	-	N	N	-	-	-	-	-	-	N	R	-
PastureGard	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Pursuit	-	-	-	N	N	N	-	H	N	R	N	N	N	N	-	-	N	-	-	R	R	R	-	-	N	R	N	-	H	N	N	N	N	N
Redeem R+P	N	H	N	N	H	H	H	N	H	N	H	H	R	N	H	R	H	R	R	N	H	N	R	N	N	N	R	H	R	N	N	N	N	H
Sethoxydim	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	N	R	N	N	N	N	N	N	N	N	R	N	N	N
Surmount	N	H	H	N	H	H	R	N	R	N	H	H	H	N	H	R	R	H	H	N	R	N	R	H	N	H	H	H	H	N	N	R	N	R
Telar	N	N	N	N	R	N	R	N	N	N	R	N	N	N	N	R	R	N	R	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
Triclopyr	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Velpar	N	N	R	N	N	R	R	N	N	N	N	N	H	N	N	N	R	N	N	N	N	N	N	H	N	R	N	N	N	H	N	N	N	N

H = Highly recommended R = Recommended N = Not recommended *Cut surface treatment

Product	Dairy Animals				Meat Animals		Slaughter
	Lactating		Nonlactating				
	Grazing	Haying	Grazing	Haying	Grazing	Haying	
	(days)						
2,4-D amine[3]	7	30	7	30	0	30	3
2,4-D ester[3]	7	30	7	30	7	30	3
2,4-D + Dicamba	7	37	0	37	0	37	30
2,4-D + Picloram	7	30	0	30	0	30	3
2,4-D + Dicamba + Metsulfuron	7	37	0	37	0	37	30
Buctril							
spring treatment	30	30	30	30	30	30	-
fall/winter treatment	60	60	60	60	60	60	-
Butyrac							
established alfalfa	30	30	30	30	30	30	-
seedling alfalfa, clover	60	60	60	60	60	60	-
Chaparral	0	0	0	0	0	0	-
Clethodim	15	15	15	15	15	15	-
Cimarron Plus	0	0	0	0	0	0	–
Dicamba							
1/2 qt/A or less	7	37	0	0	0	0	30
1-2 qt/A	40	70	0	0	0	0	30
2,4-D + Triclopyr							
2 gal or less/A	14	NS[1]	0	7	0	7	3
2-4 gal/A	NS	NS	14[2]	14	14[2]	14	3
Diuron	70	70	70	70	70	70	-
Glyphosate							
legumes							
preplant, preemerge, at-plant <44 oz/A	0	0	0	0	0	0	-
>44 oz/A	56	56	56	56	56	56	-
alfalfa preharvest	1.5	1.5	1.5	1.5	1.5	1.5	-
spot treatment (<10% total acres)	14	14	14	14	14	14	-
renovation < 44 oz	1.5	1.5	1.5	1.5	1.5	1.5	-
renovation > 44 oz	56	56	56	56	56	56	-
grass pastures							
preplant, preemerge, renovation	56	56	56	56	56	56	-
spot or wiper treatment	14	14	14	14	14	14	-
Grazon Next	0	7	0	7	0	7	-
Imazapyr	0	7	0	7	0	7	-
Journey	0	7	0	7	0	7	-
Lineage Clearstand	0	7	0	7	0	7	–
Metribuzin	28	28	28	28	28	28	-
Metsulfuron	0	0	0	0	0	0	-
Milestone	0	0	0	0	0	0	-
Maverick/Outrider	0	14	0	14	0	14	-
Overdrive	0	0	0	0	0	0	-
Paraquat							
alfalfa/clover							
dormant/clover	-	60	-	60	-	60	-
between cuttings	30	30	30	30	30	30	-
bermudagrass, dormant	-	40	-	40	-	40	-
Pastora	0	0	0	0	0	0	0
PastureGard	NS	14	0	14	0	14	3
Pursuit	30	30	30	30	30	30	30
Redeem R+P	14	NS	0	7	0	7	3
Sethoxydim	7	20	7	20	7	20	-
Surmount	14	7	0	7	0	7	3
Triclopyr							
2 qt or less/A	14	NS	0	7	0	7	3
2-4 qt/A	NS	NS	14[2]	14	14[2]	14	3
4-6 qt/A	NS	NS	14[2]	NS	14[2]	NS	3
Telar	0	0	0	0	0	0	-
Velpar	0	38	0	38	0	38	-

[1]NS indicates next season.
[2]If the area treated is less than 25 percent of grazing area, there is no restriction for nonlactating or meat animals.
[3]Restrictions vary among manufactured products. Refer to particular product label for specific restrictions.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Consult labels for approved adjuvants.

Herbicide use may require some waiting period before haying or grazing — SEE ABOVE.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preplant				
Alfalfa				
benefin at 1.1 to 1.5 lb/A	1.5 lb/gal formulation Balan at 6 to 8 pt in 10 to 20 gal water.	Incorporate immediately after application fall or spring.	Certain annual grasses and broadleafs.	**Do not** use if grain or grass crop is to be planted with alfalfa. See label.
Preemergence				
Bermudagrass, at planting				
diuron at 0.8 to 2.4 lb/A	80 WP at 1 to 3 lb, or 4L at 1.6 to 4.8 pt/A in 25 gal water.	At sprigging.	Many annuals including signalgrass and some seedling perennials.	May temporarily burn emerged bermuda and permanently injure Alicia. For control of small emerged weeds, use low rate plus surfactant. SEE PAGE 107.
Sorghum-sudan hybrids				
atrazine at 1.6 lb/A	1.8 lb 90DF or 2 lb 80WP or 3.2 pt 4L in 25 gal water.	Sorghum should be completely germinated and emerged and weeds not more than 1.5 inches high.	Annual grass and broadleaf weeds.	**Do not** use on sand or loamy sand. May injure winter annuals that follow high rates.
Postemergence				
Alfalfa seedling				
bromoxynil at 0.25 to 0.37 lb/A	Buctril at 1 to 1.5 pt/A.	Fall or spring when majority of alfalfa has a minimum of 4 trifoliate leaves.	Annual broadleaf weeds.	**Do not** add surfactant or crop oil unless specifically recommended. SEE PAGE 107.
Alfalfa only				
clethodim at 0.094 to 0.125 lb/A	6 to 8 oz/A (2 lb/gal formulation) in up to 20 gal water with 1 qt/A crop oil concentrate.	To actively growing annual or perennial grasses.	Most grasses.	Do not apply more than 32 ounces per acre to alfalfa. Do not apply a broadleaf herbicide within 1 day before or after application.
Alfalfa, Clover, seedling and established				
imazethapyr at 0.05-0.09 lb/A	Pursuit at 3 to 6 oz/A with 0.25% nonionic surfactant or 1 qt/A crop oil concentrate and 1-2 qt/A liquid N fertilizer or 2.5 lb/A spray grade ammonium sulfate.	Seedling legumes with at least 2 fully expanded trifoliate leaves or established, dormant or semi-dormant alfalfa or between cuttings.	Broadleaf weeds and certain grasses.	**Do not** exceed 6 ounces per acre per year. **Do not** apply during the last year of the stand. **Do no**t feed, graze, or harvest alfalfa within 30 days of application. In the event of stand failure, **do not** reseed alfalfa within 4 months after application. This treatment will suppress growth of grasses, such as fescue, ryegrass, and small grains seeded with legumes.
sethoxydim at 0.19 to 0.47 lb/A	1 to 1.25 pt/A (1.5 lb/gal formulation) in up to 20 gal water at 40-60 psi by ground. Add 2 pt/A oil concentrate.	To actively growing grasses.	Most grasses.	Apply no more than 5 pints per acre in one season. SEE PAGE 107.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Alfalfa, established				
metribuzin at 0.38 to 0.75 lb/A	0.5 to 1 lb/A (75 DF) or 0.8 to 1.5 pt/A (4 lb/gal formulation) in 20 to 40 gal water.	Winter dormant established	Chickweed, henbit and other winter annuals.	Apply only to winter dormant alfalfa no earlier than 12 months after seedling. SEE PAGE 107.
paraquat at 0.28 lb/A	0.75 pt/A (3 lb/gal formulation) or 2.2 pt/A (2 lb/gal formulation) in 20 to 40 gal water.	After cuttings.	Annual grasses and broadleaf weeds.	Apply to stands at least 1 year old and within 5 days after cutting. Add 1 quart of nonionic surfactant per 100 gallons of spray solution. SEE PAGE 107.
Grass pastures, established				
2,4-D at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	To actively growing weeds.	Buttercup, bitter weed, woolly croton, and others, except dogfennel, horsenettle, and smartweed.	**Do not** treat during long droughts and to **annual legumes** until after seed production. SEE PAGE 107.
2,4-D LV ester at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	November to March when crop is well established, weeds are young, but before flowering of weeds.	Mustard, turnips, dock, buttercup, and others.	Apply during a clear, warm, sunny period when weeds are young and tender. May injure young, tender ryegrass. Add 0.5 to 1 quart of surfactant per 100 gallons of spray solution for improved control especially when applied during cool weather. SEE PAGE 107.
2,4-D at 0.38 to 1.4 lb/A plus dicamba at 0.12 to 0.5 lb/A	1 to 4 pt/A (3.87 lb/gal formulation) in 20 to 40 gal water.	When weeds are young and actively growing.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel and smartweed.	Weeds should be less than 10 inches tall for lower rates. Same precautions as for dicamba alone. Clipping large weeds not dead in 2 to 3 weeks will improve control. SEE PAGE 107.
2,4-D at 0.24 to 2 lb/A plus picloram at 0.06 to 0.54 lb/A	1 to 8 pt/A or 1 to 2% solution (2.54 lb/gal formulation) in 20 to 40 gal water.	When weeds are actively growing and not stressed.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel, horsenettle, and woody brush.	Use lower rates early in the season when weeds are very small. Use higher rates for larger annual weeds or established perennials or woody brush. SEE PAGE 107.
aminopyralid at 0.06 to 0.11 lb/A	Milestone at 4 to 7 oz/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing broadleaf weeds.	Tropical soda apple, others.	Milestone will severely damage legumes. Do not plant legumes until successful field bioassay proves concentrations will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legume or broadleaf plants. Manure should not be used in areas where sensitive broadleaf plants will be placed.
aminopyralid at 0.06 to 0.11 lb/A + 2,4-D at 0.5 to 0.9 lb/A	Grazon Next at 1.5 to 2.6 pt/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing weeds.	Broadleaf weeds.	Grazon Next will severely damage legumes. Do not plant legumes in treated areas until field bioassay proves herbicide residues will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legumes or damage broadleaf plants. Manure should not be used in areas sensitive broadleaf plants will be placed.

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
aminopyralid at 0.04 to 0.13 lb/A plus Metsulfuron at 0.006 to 0.02 lb/A	Chaparral at 1 to 3.3 oz/A for broadcast or 2.5 to 3.3 oz/100 gal for spot treatments	Use lower rate for young, annual weeds and higher rate for older or perennial weeds.	Broadleaf weeds.	Treatments will severely injure legumes, bahiagrass, or fescue. Use nonionic surfactant at 1 quart per 100 gallons of spray; however, applications to tall fescue should not exceed 1 pint per 100 gallons. Do not rotate to any crop within 1 year after treatment. Do not plant forage legumes until bioassay verifies residues will not injure crop. Do not seed ryegrass within 4 months after application. Do not use treated plants or manure around desirable broadleaf plants. Do not move animals from treated fields onto fields with legumes without first moving into untreated field for 3 days.
chlorsulfuron at 0.01 to 0.06 lb/A	Telar at 0.25 to 1.33 oz/A.	Apply to young, actively growing annual weeds and while biennial or perennial weeds are still in rosette.	Annual and some biennial and perennials.	Make only one application per season. Do not exceed 1.3 ounces per acre per season. Add 1 to 2 quarts nonionic surfactant per 100 gallons of spray.
dicamba at 0.25 to 2 lb/A	0.5 to 2 pt/A for broadcast or 25 to 50% solution in oil for individual stem or cut stump treatments (2.67 lb/gal formulation).	When weeds are actively growing for foliar treatments or prior to active spring growth for stem applications with oil.	Most broadleaf weeds and small brush.	**Do not** broadcast spray more than 1 quart per acre in one season. **Do not** exceed 1 pint per acre on small grains grown for pasture. SEE PAGE 107.
diflufenzopyr at 0.005 to 0.01 lb/A plus dicamba at 0.015 to 0.03 lb/A	Overdrive at 4 to 8 fl oz/A.	Apply to young, actively growing weeds.	Annual and perennial broadleaf weeds.	Use low rate for annuals, high rate for biennials and perennials. Add 1 quart of nonionic surfactant per 100 gallons of spray or 1.5 to 2 pints per acre of methylated seed oil. Do not exceed 8 ounces per acre per season. Do not plant any rotational crop within 30 days of application. Do not apply to small grains grown for grazing. SEE PAGE 107.
imazapyr at 0.03 to 0.75 lb/A	2 to 48 oz/A spot broadcast or 0.5 to 5% solution for handgun spot treatment (2 lb/gal formulation) with 0.25% v/v nonionic surfactant.	To actively growing weeds and woody species as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Several annual and perennial grasses and broadleaf weeds plus vines and undesirable woody plants.	Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species. Do not apply more than 48 ounces per acre per year.
imazapyr + metsulfuron at 0.03 to 0.4 + 0.005 to 0.06 lb/A	Lineage Clearstand at 0.8 to 10 oz in 20 gal water plus 0.25% nonionic surfactant (v/v).	To actively growing weeds and brush as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Annual and perennial grasses and broadleaf weeds and brush.	Do not exceed 10 ounces per acre per year. Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species.
picloram at 0.44 to 0.89 lb/A plus fluroxypyr at 0.36 to 0.72 lb/A	Surmount at 3 to 6 pt/A or 0.5 to 2% solution for spot treatment.	Apply to actively growing weeds.	Many broadleaf weeds and hard-to-control perennial weeds and woody plants.	Use lower rate for small annual weeds, higher rates for larger annuals or established perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray. SEE PAGE 107.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
triclopyr at 0.25 to 2 lb/A	1 to 4 pt/A broadcast, 1 to 1.5% solution for spot spraying weeds, or 20 to 33% solution with oil for dormant woody stem (4 lb/gal formulation).	When weeds are actively growing for broadcast or spot sprays or before bud break for applications with oils to woody stems.	Broadleaf weeds and woody vines, shrubs, and trees.	Add 1 to 2 quarts nonionic surfactant per 100 gallons with broadcast sprays. SEE PAGE 107.
triclopyr at 0.42 to 1.1 lb/A + clopyralid at 0.14 to 0.38 lb/A	Redeem R&P at 1.5 to 4 pt/A	To actively growing grasses.	Broadleaf weeds.	Use lower rates for weeds such as bitter sneezeweed, ragweed, thistle, marshelder, and croton; higher rates for spiny pigweed, horsenetle, and dogfennel.
triclopyr at 0.38 to 1.5 lb/A plus fluroxypyr at 0.125 to 0.5 lb/A	PastureGard at 2 to 8 pt/A for broadcast applications, or 1 to 2% solution for spot treatment, or 50:50 mix with oil and 10% penetrant for individual woody stem or cut stump treatment.	Apply foliar treatments to weeds that are actively growing and not stressed, and mixtures with oils to dormant stems.	Broadleaf annual and perennial weeds, including tropical soda apple, or woody perennials, such as vines, brambles, shrubs, and trees.	Use low rates for small annual weeds, higher rates for large annuals or perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray for applications. SEE PAGE 107.
triclopyr at 0.25 to 1 lb/A + 2,4-D at 0.5 to 2 lb/A	1 to 4 qt/A or 1 to 1.5% solution with water for broadcast or 1 to 4% solution with oil (3 lb/gal formulation) for dormant woody stems.	When weeds are actively growing for broadcast applications or just before breaking dormancy for woody stem treatments.	Annual and perennial broadleaf weeds and some woody vines and shrubs.	Adding 1 to 2 quarts of nonionic surfactant per 100 gallons of spray may enhance control. Do not reseed pastures within 3 weeks after treatment. Do not exceed 4 quarts per acre per season. Do not apply to newly seeded grasses until after tillering. SEE PAGE 107.
Bermuda and Bahiagrass, established				
hexazinone 0.69 to 1.13 lb/A	Velpar L 2.75 to 4.5 pt/A.	To actively growing smutgrass from May to October 15.	Smutgrass and many broadleaf weeds.	**Do not** apply near the root system of desirable woody plants such as oak trees. Apply with 1 quart of surfactant per 100 gallons of water. SEE PAGE 107.
sulfosulfuron at 0.06 to 0.09 lb/A	Maverick/Outrider at 1.3 to 2 oz in 20 gal water with 0.25% nonionic surfactant (v/v).	To actively growing weeds.	Johnsongrass, sedges, ryegrass, mustards, and buttercup.	Sequential applications can be made no sooner than 40 days after the previous treatment. Do not exceed 2.66 ounces per acre per year.
Bermudagrass, established				
imazapic + glyphosate at 0.06 to 0.19 + 0.1 to 0.4 lb/A	Journey at 10 to 32 oz/A broadcast or as 0.625 to 13% solution for spot treatments.	To actively growing weeds	Vaseygrass, Johnsongrass, crabgrass, signalgrass, barnyardgrass, sandbur, and nutsedge	Methylated seed oil is preferred over nonionic surfactant. Use 1.5 to 2 pints per acre for broadcast or 1% for spot applications. Do not apply during transition from dormant to active growth. Do not apply to 'World Feeder,' Tifton 85, or hybrid bermudagrass. Do not exceed 21 ounces per acre on Coastal bermudagrass. Do not apply within 30 days of aeration. Bermudagrass growth will likely be suppressed 30 days.
metsulfuron methyl 0.0038 to 0.015 lb/A	Metsulfuron at 0.1 to 0.4 oz/A in a minimum of 10 gal/A or 1 oz/100 gal for spot applications.	To actively growing weeds. For bahiagrass control, use 0.3 oz after green-up and before seedhead formation.	Pensacola bahia, wild garlic, buttercup, bitter sneezeweed, pig- weed, and woolly croton.	Add 0.5 to 1 quart of nonionic per 100 gallons of spray solution surfactant. Will not control Argentine bahiagrass. **Do not apply to Bahiagrass pastures.** Following Cimmarron applications at 0.1 to 0.3 ounce per acre, red, white, or sweet clover, bermudagrass, ryegrass, or tall fescue can be planted after 4 months; wheat after 1 month; barley or oats after 10 months. Do not apply more than 1.67 ounce per acre per season. Do not use on soils with pH above 7.9.

Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
metsulfuron + 2,4-D + dicamba 0.004 to 0.011 + 0.36 to 0.72 to 1.4 + 0.125 to 0.25 to 0.5	Cimarron Max 0.1 to 0.3 oz/A Part A + 1 to 2 to 4 pt/A Part B	To actively growing weeds	Bahiagrass, woolly croton, bitter sneezeweed, vetch, dock, garlic dogfennel, marestail, blackberry, multiflora rose, and many other annual and perennial weeds	Add 1 quart of nonionic surfactant per 100 gallons of finished spray solution. Does not control 'Argentine' bahiagrass. Do not apply more than 1.67 ounces of Part A per acre per season.
Nicosulfuron at 0.35 to 0.53 lb/A + metsulfuron methyl at 0.009 to 0.014 lb/A	Pastora at 1 to 1.5 oz/A with 0.25% nonionic surfactant (v/v)	To actively growing annual grassy weeds less than 2 inches tall, annual broadleaf weeds less than 4 inches tall, and some perennial weeds.	Johnsongrass, vaseygrass, ryegrass, and many broadleaf weeds	Crop oil concentrate at 1% (v/v) may increase weed control but may also increase potential for bermudagrass injury. Bermudagrass must be established for at least one season before application.
Bermudagrass, dormant				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Mid-March.	Emerged annual broadleaf weeds and grasses in dormant bermuda.	Add 1 quart of nonionic surfactant per 100 gallons of spray solution. Must be applied prior to seed head emergence for satisfactory control of little barley. SEE PAGE 107.
Bermudagrass and Bahiagrass, sod suppression				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Early fall to sods not exceeding 3 inches in height.	Supresses summer grass while winter annuals establish.	Add 1 quart of nonionic surfactant per 100 gallons of spray. SEE PAGE 107.
Endophyte-Infested Tall Fescue Destruction				
paraquat 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant followed by a second application 10 to 21 days later at the same rate.	When fescue is actively growing.	Endophyte-infected fescue and annuals.	Add 0.5 or 1 quart of nonionic surfactant per 100 gallons of spray solution. If new growth appears within 10-14 days, make a second application. Do not exceed 3 pints per acre. SEE PAGE 107.
glyphosate at 0.75 lb/A	Glyphosate 4/5 lb/gal at 2/1.2 pt in 3 to 10 gal water plus 0.5 to 1% surfactant	When fescue is actively growing in the fall and plants are 6 to 12 inches tall.	Endophyte-infected fescue and other annual plants.	A sequential application of 1 pint plus surfactant will improve long-term control. SEE PAGE 107.

TURF GUIDELINES

TURFGRASS TOLERANCE TO HERBICIDES

Herbicide	Common Bermuda	Hybrid Bermuda	Centipede	St. Augustine	Zoysia
2,4-D	Yes	Yes	Yes	S	Yes
2,4-D + 2,4-DP	Yes	Yes	Yes	S	Yes
2,4-D + dicamba	Yes	Yes	Yes	S	Yes
2,4-D + MCPP	Yes	Yes	Yes	S	Yes
2,4-D + MCPP + dicamba	Yes	Yes	Yes	Y/N[1]	Yes
2,4-D + MCPP + dicamba + carfentrazone	Yes	Yes	Y/N	Y/N	Yes
2,4-D + clopyralid + dicamba	Yes	Yes	No	No	Yes
asulam	-	Yes	-	Yes	-
atrazine	Yes	Y/N	Yes	Yes	Yes
benefin	Yes	Yes	Yes	Yes	Yes
benefin + oryzalin	Yes	Yes	Yes	Yes	Yes
bensulide	Yes	Yes	Yes	Yes	Yes
bentazon	Yes	Yes	Yes	Yes	Yes
bromoxynil	Yes	Yes	-	Yes	Yes
bentazon + atrazine	Yes	Yes	Yes	Yes	Yes
carfentrazone	Yes	-	Yes	Yes	Yes
chlorsulfuron	Yes	Yes	-	-	-
clopyralid	Yes	Yes	Yes	Yes	Yes
clopyralid + triclopyr	Yes	Yes	-	-	-
dicamba	Yes	Yes	Yes	Yes	Yes
diclofop	Yes	Yes	-	-	-
dithiopyr	Yes	Yes	Yes	Yes	Yes
DCPA	Yes	Yes	Yes	Yes	Yes
fenarimol	Yes	Yes	-	-	-
fenoxaprop	S	S	S	S	Yes
flazasulfuron	Yes	Yes	Y/N	S	Yes
fluazifop	S	S	S	S	Yes
foramsulfuron	Yes	Yes	-	-	-
halosulfuron	Yes	Yes	Yes	Yes	Yes
imazaquin	Yes	Yes	Yes	Yes	Yes
isoxaben	Yes	Yes	Yes	Yes	Yes
MCPP	Yes	Yes	Yes	Yes	Yes
mesotrione	S	S	Yes	Y/N	S
metolachlor	Yes	Yes	Yes	-	Yes
metribuzin	Yes	Yes	-	-	-
metsulfuron	Yes	Yes	Yes	Yes	Yes
MSMA	Yes	Yes	S	S	Yes
MSMA + metribuzin	Yes	Yes	-	-	-
oryzalin	Yes	Yes	No	Yes	Yes
oxadiazon	Yes	Yes	Yes	Yes	Yes
pendimethalin	Yes	Yes	Yes	Yes	Yes
pronamide	Yes	Yes	Yes	Yes	Yes
prodiamine	Yes	Yes	Yes	Yes	Yes
quinclorac	Yes	Y/N	S	S	Yes
quinclorac + sulfentrazone	Yes	Yes	S	S	Yes
rimsulfuron	Yes	Yes	-	-	-
sethoxydim	S	S	Yes	S	S
simazine	Yes	Yes	Yes	Yes	Yes
sulfentrazone	Yes	Yes	Yes	Y/N	Y/N
sulfosulfuron	Yes	Yes	Yes	Yes	Yes
trifloxysulfuron	Yes	Yes	-	-	Yes

[1] Use only products with a 0.5 : 1 : 0.1 ratio of 2,4-D: MCPP: and dicamba on St. Augustinegrass

S Indicates susceptible, herbicide known to severely damage or kill turfgrass.

Yes Indicates tolerant when applied according to label directions.

Y/N Indicates intermediate, use with caution, or at reduced rates. Consult label for product use instructions and restrictions prior to considering use.

- Indicates not labeled or data not available.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

ESTIMATED PREEMERGENCE CONTROL

Weeds	atrazine	benefin	bensulide	benefin + oryzalin	benefin + trifluralin	dithiopyr	fenarimol	isoxaben	metolachlor	oryzalin	oxadiazon	oxadiazon + prodiamine	pendimethalin	prodiamine	pronamide	simazine
annual bluegrass	G	G	G	G	G	E	E	N	-	E	G	-	E	E	E	E
bahiagrass	-	G	G	G	-	-	-	-	-	G	G	-	G	-	-	-
buttercup	N	N	N	N	-	-	N	-	-	N	F	-	N	-	-	N
carpetweed	-	G	G	G	-	-	N	F	-	G	E	-	N	-	-	E
chamberbitter	G	-	-	-	-	-	-	G	-	-	G	-	-	G	-	G
chickweed	E	N	F	F	G	-	N	E	-	G	F	-	G	-	F	E
clovers	G	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
crabgrass	F	G	E	E	G	E	N	N	G	E	G	E	E	E	-	F
dallisgrass	-	G	G	G	-	-	N	N	-	G	-	-	G	-	-	-
dandelion	-	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
dichondra	E	N	N	N	-	-	N	-	-	N	N	-	N	-	-	N
Florida betony	E	N	N	N	-	-	N	-	-	N	N	-	N	-	-	-
Florida pusley	E	N	F	F	-	-	N	F	-	N	-	-	N	-	-	G
goosegrass	F	F	F	F	G	G	N	-	-	G	E	E	G	E	-	N
ground ivy	N	N	N	N	-	-	N	-	-	N	G	-	N	-	-	G
henbit	-	N	N	N	-	-	N	G	-	N	G	-	N	-	-	E
knotweed	G	N	F	F	G	-	N	G	-	F	-	-	N	-	-	G
lawnburweed	G	N	N	N	-	-	N	-	-	N	F	-	N	-	-	E
lespedeza	G	N	N	N	-	-	N	-	-	N	-	-	N	-	-	F
pennywort	-	N	N	N	-	-	N	G	-	N	-	-	N	-	-	N
plantain	-	N	N	N	-	-	N	G	-	N	N	-	N	-	-	F
prostate spurge	-	N	N	N	-	-	N	F	-	N	G	-	F	-	-	G
sandbur	F	G	G	G	-	-	N	-	-	G	G	-	G	-	N	-
sherpherdspurse	-	N	N	N	-	-	N	E	-	N	G	-	N	-	-	E
speedwell	E	N	N	N	-	-	N	G	-	N	G	-	N	-	-	F
Virginia buttonweed	-	N	N	N	-	-	N	-	-	N	G	-	N	-	-	G
wood sorrel	G	N	N	N	-	-	N	G	-	F	G	-	F	-	-	G

E = Excellent, G = Good, F = Fair, N = No control, - = Data not available

ESTIMATED POSTEMERGENCE CONTROL

Weeds	asulam	atrazine	bentazon	chlorsulfuron	clopyralid	clopyralid + triclopyr	2,4-D	2,4-D + mecoprop	2,4-D + dicamba	2,4-D + mecoprop + dicamba	2,4-D + mecoprop + dicamba + carfentrazone	diclofop	dicamba	diquat	foramsulfuron	fenoxaprop	flazasulfuron	fluazifop	glyphosate	halosulfuron	imazaquin	mecoprop	mesotrione	metribuzin	metsulfuron	MSMA	MSMA + metribuzin	pronamide	quinclorac	rimsulfuron	sethoxydim	simazine	sulfentrazone	sulfosulfuron	trifloxysulfuron
annual bluegrass	-	E	N	N	N	N	N	N	N	N	N	-	N	G	E	N	F	-	E	N	N	N	N	G	N	N	N	E	-	E	F	E	N	G	E
bahiagrass	-	N	-	-	N	N	N	N	N	N	N	N	N	-	N	G	-	-	E	N	N	N	-	N	E	F	F	N	-	-	G	N	N	N	F
buttercup	-	N	-	-	-	G	F	G	G	E	E	N	E	F	-	N	-	N	E	-	-	F	-	G	-	N	N	-	-	-	N	N	-	-	-
carpetweed	-	E	-	-	N	-	G	G	G	G	G	N	G	N	-	N	-	N	E	-	-	F	Y	N	N	N	G	-	-	-	N	E	-	-	-
chamberbitter	-	G	-	F	-	-	-	-	-	-	-	-	-	-	-	-	F	N	-	-	N	-	-	-	G	-	-	-	-	-	-	G	-	N	F
chickweed	G	E	-	-	-	E	F	G	G	E	E	N	E	G	-	N	E	N	E	-	G	G	-	G	G	N	N	F	-	G	N	E	-	E	E
clovers	-	G	-	N	E	E	N	G	E	E	E	N	E	P	N	N	G	N	E	-	N	E	-	N	G	N	N	-	-	-	N	G	F	N	G
crabgrass	G	F	N	-	N	N	N	N	N	N	N	-	N	N	-	E	G	G	E	-	-	N	G	N	N	E	E	N	G	N	G	F	-	N	-
dallisgrass	N	N	N	-	N	N	N	N	N	N	N	N	N	N	F	N	P	-	E	N	N	N	N	N	N	E	E	-	-	N	F	N	N	N	-
dandelion	-	F	-	G	-	E	E	E	E	E	E	N	G	N	N	N	F	N	E	N	F	F	-	N	G	N	N	-	-	-	N	F	-	F	E
dichondra	-	N	-	-	-	-	F	G	G	G	-	N	G	N	-	N	P	N	E	-	-	-	-	N	N	N	N	-	-	-	N	N	-	-	-
Florida betony	-	N	N	N	-	G	N	-	G	G	G	N	G	N	-	N	-	N	E	N	N	-	-	N	E	-	N	-	-	-	N	-	-	-	-
Florida pusley	-	N	-	-	-	-	N	N	-	-	-	N	-	N	-	N	-	N	E	-	-	N	-	-	G	N	N	-	-	-	N	N	-	-	-
goosegrass	F	N	N	-	N	N	N	N	N	N	N	E	N	N	G	G	P	-	E	-	-	N	G	N	N	F	E	N	-	N	F	N	G	N	-
ground ivy	-	G	-	-	-	-	G	-	-	-	-	N	-	N	-	N	-	N	E	-	-	-	-	G	G	N	G	-	-	-	N	N	-	-	-
henbit	-	E	-	-	-	E	F	G	G	E	E	N	E	G	E	N	E	N	E	-	F	F	-	G	G	N	N	-	-	E	N	E	-	E	E
knotweed	-	G	-	-	G	-	F	G	G	G	-	N	E	N	-	N	-	N	E	-	-	G	-	N	E	N	N	-	-	-	N	G	-	-	N
kyllinga	-	-	-	N	N	N	N	N	N	N	N	N	N	-	N	N	-	N	E	F	F	N	-	-	N	-	-	-	-	-	N	N	E	E	G
lawnburweed	-	E	-	E	-	-	F	F	G	G	G	N	G	G	N	N	E	N	E	N	E	-	-	G	E	N	N	N	-	G	N	E	-	E	E
lespedeza	-	F	-	-	-	-	F	G	G	G	G	N	E	N	-	N	-	N	E	-	-	G	-	N	G	N	F	-	-	-	N	F	-	-	-
nutsedge, purple	N	N	N	-	N	N	N	N	N	N	N	N	N	N	-	N	F	N	G	E	E	N	-	N	N	F	F	N	-	-	N	N	G	E	E
nutsedge, yellow	N	N	E	-	N	N	N	N	N	-	N	N	N	N	-	N	F	N	G	E	E	N	-	N	N	F	F	N	-	-	N	N	G	E	E
path rush	-	-	-	N	-	-	G	-	-	G	-	-	N	-	-	N	P	N	E	-	N	-	-	-	N	-		-	-	-	-	-	-	N	-
pennywort	-	F	-	-	-	G	F	-	-	F	-	N	-	N	-	N	P	N	E	-	F	-	-	-	G	F	E	-	-	-	N	N	-	-	-
plantain	-	F	-	-	G	F	E	G	G	G	E	N	F	N	-	N	-	N	E	-	-	F	-	N	G	N	N	-	-	-	N	F	-	-	-
prostrate spurge	-	G	-	-	N	E	N	F	G	G	G	N	F	N	-	N	-	N	E	-	-	N	-	N	G	N	N	-	-	-	N	G	-	-	-
ryegrass	-	-	-	E	N	-	N	N	N	N	N	-	N	-	E	N	E	-	E	N	N	N	N	-	E	N	-	E	-	E	-	E	N	N	E
sandbur	-	-	-	-	N	N	N	N	N	N	N	-	N	N	N	-	-	-	E	-	-	N	-	N	N	G	E	N	-	-	F	-	-	-	-
shepherdspurse	-	E	-	-	-	-	G	G	G	G	G	N	G	G	-	N	-	N	E	-	-	F	-	G	G	N	N	-	-	-	N	E	-	-	-
speedwell	-	-	-	-	G	-	N	F	F	F	F	N	N	G	-	N	P	N	E	-	N	N	-	N	N	N	N	-	-	-	N	-	-	N	-
tall fescue	N	N	N	F	N	N	N	N	N	N	N	N	N	N	-	-	G	N	G	N	N	N	N	N	N	N	N	N	-	-	F	N	N	F	G
torpedograss	N	N	N	-	N	N	N	N	N	N	N	N	N	N	N	-	P	N	N	N	N	N	-	N	N	N	N	N	G	-	N	N	-	N	G
tufted lovegrass	-	N	-	N	N	N	N	N	N	N	N	N	N	-	N	G	P	G	E	N	N	N	E	N	N	N	N	-	N	N	N	N	G	N	N
Virginia buttonweed	-	N	-	G	-	F	N	F	G	G	G	N	F	N	-	N	P	N	E	-	N	N	-	N	F	N	N	-	-	-	N	N	-	N	-
wild garlic	-	N	-	-	N	F	F	F	F	F	F	N	F	N	F	N	P	N	G	-	E	N	-	N	F	N	N	N	-	E	N	N	F	N	E
wood sorrel	-	G	-	-	-	-	N	N	F	F	F	N	G	N	-	N	F	N	E	-	F	F	-	N	G	N	N	-	-	-	N	G	-	-	-

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preplant — *new lawns or other turf areas*					
methyl bromide	10 - 20 lb		435 - 870	Seed, vegetative structures of perennial weeds, nematodes and fungi	Apply when soil temperatures are above 60 ºF and before planting and soil is moist but not saturated with water. Spade or plow soil about 8-10 inches. Release chemical under a gas proof cover. **CAUTION: Deadly Gas**. Plant in soil 2-4 days after treatment. Follow label directions. **Additional Comments Restricted Use Pesticide**
metham	0.9 - 1.72 gal of 4.62 lb/gal	37.5 - 75 gal/A of 4.26 lb/gal	159 - 319	Dormant weed seed	Mix with water and apply uniformly to plowed soil. Water adequately after applying to seal the soil, and maintain soil moisture for next few days per label instructions, if a gas-proof cover is not used. Till 5-7 days after treating on sandy soil or 14 days on clay soil. Soil temperature should be above 60 ºF. Soil should be moist at the time of application. Although a gas-proof cover such as plastic is not required, efficacy is generally increased with one.
glyphosate	4.5 - 8.8 tbsp of 3 lb ae/gal 3.2 - 5.5 tbsp of 4 lb ae/gal 1.5 - 0.75 oz of 64.9% dry formulation	3 - 5 qt/A of 3 lb ae/gal 2.2 - 3.7 qt/A of 4 lb ae/gal 67 - 112 oz of 64% DF See table on pages 5-6 for other formulations	2.25 - 3.75 lb ae/A	Most annuals and perennials including bermudagrass	Turfgrass renovation. Follow label specification. **Do not** mow or till for 7 days after treatment. Turfgrass may be established as soon as control is accomplished. Consult label to determine if surfactant is needed.
diquat	0.5 - 0.75 fl oz of 2 lb/gal	16 - 32 fl oz/A of 2 lb/gal	0.25 - 0.5	Most annuals	Turfgrass renovation. Same as glyphosate. Use 0.25% v/v nonionic surfactant.
dazomet	8 lb of a 99G formulation	350 lb of a 99G formulation	347	Annual weeds and reduction of root-propagated weeds such as bermudagrass and sedges	Follow the label for tillage and water requirements both pre- and postapplication. Use lettuce seed bioassay to determine if it is safe to plant or sprig after application. For use on golf greens and tees.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preemergence — *lawns and general turf*					
Apply only to established warm-season turfgrasses. Most preemergence herbicides may not be applied during the establishment year. Consult labels for restrictions.					
Apply in sufficient water to insure uniform coverage.					
Apply before weeds emerge. Most preemergence herbicides have no postemergence activity.					
Irrigate with a minimum of 0.5 inch of water following application to activate.					
atrazine	0.75 - 1.5 fl oz of 4 lb/gal 0.4 - 0.8 oz of 90 WDG 3.74 - 5 lb of 20-0-20 containing 0.9% atrazine 3 lb of 35-0-0 containing 0.8% atrazine	1 to 2 qt/A or 4 lb/gal or 1.1 to 2.2 lb/A of 90%	1 - 2	Annual bluegrass, henbit, chickweeds, clovers, lawnburweed, and other broadleaf weeds	Apply after Oct. 1 for control of winter weeds or in late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool season turfgrasses.
benefin	3 lb of 2.5 G	120 lb/A of 2.5 G	3	Crabgrass, annual bluegrass, and other grassy weeds	Apply March 1 for summer weed control. For winter weed control, apply in August or September. Follow directions on label. **Do not** use on golf-putting greens.
benefin + oryzalin	3.4 lb of 2G	150 lb/A of 2 G	3	Annual grasses including goosegrass	**Do not** use on golf greens.
benefin + trifluralin	6 - 8 lb of 0.86% on fertilizer or 2.25 - 3.50 lb of 2G	100 - 150 lb/A of 2 G	2 - 3	Annual grasses and some small seeded broadleaves	**Do not** use on golf greens.
bensulide	7 - 10 lb of 2 G	600 - 750 lb/A of 2 G	12 - 15	Crabgrass, annual bluegrass, and other grassy weeds	Same as benefin. If used on golf putting greens, apply at least 120 days before overseeding. Some root pruning can be expected.
DCPA	5.1 oz of 75 WP	14 lb/A of 75 WP	10.5	Crabgrass, annual bluegrass, creeping speedwell, and spurges	Early spring applications may be made to new turfgrass seedlings after the grasses have exhibited a uniform greening of the newly sprouted grass, preferably when 1 to 2 inches in height.
dithiopyr	1.5 fl oz of 1 lb/gal product or 0.35 oz of 40 WSP	2 qt/A of 1 EC 0.95 lb/A of 40 WSP	0.5 (EC) 0.38 (WSP)	Annual grasses	May be used early postemergence for crabgrass prior to tillering. Consult label for use directions and precautions.
fenarimol	4-6 fl oz of 1 lb/gal	1.36 - 2.04 gal/A of 1 lb/gal	1.36 - 2.04	Annual bluegrass	Use on bermudagrass greens to be overseeded with perennial ryegrass (two or three application sequence with the last application 2 weeks prior to overseeding). Consult label for timing restrictions for overseeded bentgrass and Poa trivialis.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
isoxaben	0.25 - 0.5 oz	0.66 - 1.33 lb/A of 75 DF	0.5 - 1	Annual broadleaf weeds	**Do not** apply to golf course greens or tees.
metolachlor	1-2 oz of 7.62 EC	1.3 to 2.6 pt/A of 2.62 EC	1.2 - 2.4	Yellow nutsedge	Apply before March 1.
oryzalin	1.1 + 1.1 fl oz of 4 lb/gal or 1 + 1 oz 75 WSP	1.5 + 1.5 qt/A of 4 lb/gal	1.5 + 1.5	Annual grasses including goosegrass	**Do not** use on golf greens. Make sequential application 8 weeks after initial application.
oxadiazon	2.5 - 4.5 lb of 2G	100 to 200 lb/A of 2 G	2 - 4	Goosegrass, crabgrass, and some small-seeded broadleaf weeds	**Do not** use on centipedegrass. **Do not** apply to golf greens. **Do not** apply to wet turfgrass.
oxadiazon + prodiamine	4.5 lb of 1.2 G on 38-0-0 fertilizer	200 lb/A of 1.2 G	2.4	Crabgrass, goosegrass, and some broadleaf weeds	**Do not** apply to wet foliage. Contains slow-release fertilizer.
pendimethalin	3 lb of 2 G or 2.5 lb of 2.45 G or 1.75 oz of 60 WDG or 2.7 fl oz of 3.3 lb/gal or 2.3 fl oz of 3.8 CS	150 lb/A of 2 G or 122 lb/A of 2.45 G or 5 lb/A of 60 WDG or 0.9 gal/A of 3.3 EC or 6.3 pt of 3.8 CS	1.5 - 3	Crabgrass, goosegrass, other grasses, and some small-seeded broadleaf weeds	Certain formulations or mixtures containing pendimethalin may be used on bermudagrass greens. Consult label for specific information. Also consult the label for residential and sod farm turfgrass, which is lower than the use rate for commercial turf.
prodiamine	0.36 - 0.83 oz of 65 WG or 0.5 - 1.1 fl oz of 4 FL	1 - 2.3 lb/A of 65 WDG or 21 - 48 fl oz/A of 4 FL	0.65 - 1.5	Annual grasses	Sequential applications may be needed, especially if goosegrass is the target weed. **Do not** make more than two applications per year, and do not apply more than 1.5 pounds of active ingredient per acre per year.
pronamide	0.367 oz of 50 WSP	1 lb/A of 50 WSP	0.5	Annual bluegrass	May also be used postemergence.
simazine	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 - 2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Apply after Oct. 1 for control of winter weeds or during late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool-season turfgrasses. May also be used postemergence (uptake only through soil, irrigate following application to activate).

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Postemergence					
Use postemergence herbicides when weeds are actively growing, preferably when weeds are in the seedling stage.					
Apply postemergence herbicides in sufficient carrier (water) to provide good coverage, usually 25 – 30 gallons per acre.					
A nonionic surfactant may enhance control. Consult labels to determine if surfactant should be used.					
Appy when temperatures are sufficient for active growth of weeds. For MSMA and other arsenicals, temperature should be above 80 ºF. For phenoxy herbicides (2,4-D, etc) temperatures above 70 ºF are desirable. Always consult the product label for temperature requirements for maximum efficacy.					
2,4-D (amine) Bermudagrass Centipedegrass Zoysiagrass	1.5 tbsp of 4 lb/gal	1 qt/A or 4 lb/gal	1	Dandelion, dock, plantain, certain clovers, wild garlic, VA buttonweed, other broadleaf weeds	Apply when weeds are young and actively growing. Repeat applications may be necessary. Use low pressure (25 psi) and avoid spray drift onto susceptible flowers and shrubs. Use 0.5 lb on 'Tifgreen' and 'Tifdwarf' bermudagrass.
2,4-D + dicamba Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	5 tbsp of 1.25 + 0.125 lb/gal	0.8 gal/A of 1.25 + 0.125 lb/gal	1.0 + 0.1	Many broadleaf weeds	Consult product label for turfgrass tolerance. Labeling varies. **Do not** use more than 0.5 pound ae per acre of 2,4-D per application in St. Augustinegrass. **Do not** use within drip line of trees or shrubs. **Do not** use more than a total of 1.5 pounds of 2,4-D + dicamba having a ratio 8:1 to 10:1. See 2,4-D and dicamba for additional comments.
2,4-D + mecoprop Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	3 tbsp of 0.88 + 0.88 lb/gal	0.56 gal/A of 0.88 to 0.88 lb/gal	0.5 + 0.5	Spurges, clovers, and other broadleaf weeds	Observe precautions for 2,4-D. Consult product label for turfgrass tolerance. **Labeling varies. Do not** use more than 0.5 pound ae per acre of 2,4-D per application in St. Augustinegrass. **Do not** exceed total of 1.5 pounds of this combination per acre.
2, 4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass	1.2 - 1.5 fl oz of 2.03 + 1.08 + 0.21 lb/gal	3 - 4 pt/A	1 + 0.5 + 0.1	Broad spectrum of broadleaf weeds	Many three-way products of this type **[1 : 0.5 : 0.1 ratio of 2,4-D : mecoprop : dicamba]** are available. Labeling varies; most are labeled for use on bermudagrass and zoysiagrass. Few are labeled for use on St. Augustinegrass, and then only at reduced rates. Few with this ratio are labeled for use in centipedegrass. **Consult product labels for specific labeling, including restrictions. Do not** use within drip lines of trees or shrubs. Observe precautions for each component part.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
2,4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass St.Augustinegrass	0.4 - 0.56 fl oz of 1.5 + 2.77 + 0.31 lb/gal	1 - 1.5 pt/A	0.28 + 0.52 + 0.05	Broad spectrum of broadleaf weeds	A few three-way products of this type **[0.5 : 1 : 0.1 ratio of 2,4-D: mecoprop : dicamba]** are available. Although many of these products may be used on all warm-season turfgrasses, they are targeted for use in St. Augustinegrass.
2,4-D + MCPP + dicamba + carfentrazone Bermudagrass Zoysiagrass	0.75 - 1.5 fl oz of 0.05 + 1.53 + 0.48 + 0.14 lb/gal	2 - 4 pt	0.025 + 0.75 + 0.24 + 0.07	Broad spectrum of broadleaf weeds	**Do not** use on St. Augustinegrass or centipedegrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 ºF.
2,4-D + MCPP + dicamba + carfentrazone St. Augustinegrass Centipedegrass Bermudagrass Zoysiagrass	0.75 - 1.8 fl oz of 0.04 + 0.52 + 0.2 + 0.05 lb/gal	2 - 5 pt	0.025 + 0.325 + 0.125 + 0.031	Broad spectrum of broadleaf weeds	**Do not** use more than 4 pints per acre except on common bermudagrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 ºF.
2,4-D + clopyralid + dicamba Bermudagrass Zoysiagrass	0.72 - 1.1 fl oz of 3 - 0.375 + 0.375 lb/gal	2 - 3 pt/A	1.25 + 0.14 + 0.14	Broad spectrum of broadleaf weeds	**Do not** use on centipedegrass or St. Augustinegrass. Not labeled for use on sod farms.
asulam St. Augustinegrass Tifway Bermudagrass	3 - 4 tbsp of 3.34 lb/gal	5 pt/A	2	Crabgrass	Sod production use only. **Do not** apply to St Augustinegrass under stress or freshly mowed. **Do not** make more than one application per year.
atrazine + bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.66 - 0.88 fl oz of 2.5 + 2.5 lb/gal	1.8 - 2.4 pt/A	0.56 + 0.56 - 0.75 + 0.75	Annual and perennial broadleaf weeds and yellow nutsedge	Perennial weeds and sedges require two applications 7-10 days apart. Apply with crop oil concentrate at 2 pints per acre. Apply no earlier than 10 days after sprigging or plugging. Some discoloration and slowing of growth may occur on newly sprigged turfgrasses.
bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 fl oz of 4 lb/gal	2 pt/A	1	Yellow nutsedge	Apply to actively growing yellow nutsedge at 10- to 14-day intervals, but no more than three applications per season. **Do not** mow for 3-5 days after application. Will not control purple nutsedge. **Do not** use on golf greens.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
bromoxynil Bermudagrass Zoysiagrass St. Augustinegrass Perennial ryegrass	0.375 to 0.75 fl oz of 2 lb/gal	1 - 2 pt	0.25 - 0.5	Broadleaf weeds	For use only on established and newly seeded grasses grown for seed or sod and nonresidential turfgrasses. **Do not** apply with backpack or hand-held equipment.
carfentrazone Bermudagrass Bahiagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.012 - 0.048 fl oz of 1.9 lb/gal	0.55 - 2.1 fl oz	0.008 - 0.03	Broadleaf weeds	Works best as an addition to other herbicides such as 2,4-D, dicamba, dichloroprop, or other auxin type herbicides or combinations. Provides a faster burndown of weeds.
carfentrazone Bermudagrass Bentgrass	0.154 fl oz	6.7 fl oz	0.099	Silvery thread moss	Apply twice 2 weeks apart. Use a surfactant at 1 quart per 100 gallons. Repeated applications can be made but not to exceed 0.40 pound of active ingredient per acre. It is labeled for bermudagrass and bentgrass greens.
chlorsulfuron Bermudagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.05 - 0.25 oz	(1 - 5.33 oz/A of 75 DF)	0.08 - 0.24	Tall fescue, perennial ryegrass, chickweed, henbit, and many other broadleaf and grassy weeds	Not for use on sod farms. **Do not** apply in the root zones of desirable trees or shrubs or where runoff may flow into agricultural land.
clopyralid Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.1 - 0.5 fl oz of 3 lb/gal	0.25 - 1.33 pt/A	0.09 - 0.45	Clovers, black medic, and other broadleaf weeds	Can cause injury to desirable legumes and composite species. Consult label for tank-mixing with other postemergence herbicides for broadleaf weed control.
clopyralid + triclopyr Bermudagrass	0.37 – 0.74 fl oz of 0.75 + 2.25 lb/gal	1 - 2 pt/A	0.09 + 0.29	Wild violet, common lespedeza, and other broadleaf weeds	**Do not** use on golf tees or greens. **Do not** use more than 4 pints per acre per year. **Do not** allow contact with desirable trees or shrubs. Mow newly seeded turf two or three times prior to first application. Additional applications should not be made less than 4 weeks apart.
dicamba Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 tbsp of 4 lb/gal	0.5 pt/A	0.25	Many broadleaf weeds	**Do not** use within dripline of shrubs or trees. Roots take up the chemical from the soil and some species are damaged. Good for use on golf greens and tees.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
diclofop Bermudagrass	0.75 - 1 fl oz of 3 lb/gal	32 - 43 fl oz/A	0.75 - 1	Goosegrass	Bermudagrass on golf courses only. May be used on bermudagrass golf greens. Apply postemergence to actively growing goosegrass with four or fewer leaves in a spray volume of 30 to 60 gallons per acre. **Do not** apply to stressed grasses. Activity may be increased on larger goosegrass if applied with a 0.25%, by-volume, nonionic surfactant. **Do not** tank mix with other herbicides, make applications to newly established turfgrass with stolons less than 4 inches, or overseed areas for 3 months following application. **RESTRICTED USE PESTICIDE.**
diquat Dormant Bermudagrass or Zoysiagrass turf only	0.5 - 0.75 fl oz of 2 lb/gal	1 - 2 pt/A	0.25 - 0.5	Winter annual broadleaf and grassy weeds	Bermudagrass or zoysiagrass must be dormant or injury will occur.
flazasulfuron Bermudagrass Zoysiagrass Centipedegrass	0.035 - 0.07 oz of 25 DF	1.5 - 3 oz of 25 DF	0.023 - 0.047	Annual and perennial ryegrass, 2- to 3-leaf crabgrass, tall fescue, clovers, and other broadleaf weeds	Repeat applications are necessary for control of crabgrass. Use 0.5 ounce per acre for transition from overseeded perennial ryegrass or roughstalk bluegrass. Flazasulfuron is not for use on golf course greens or residential turfgrasses. Use nonionic surfactant at the rate of 1 quart per 100 gallons.
fenoxaprop Zoysiagrass	0.64 fl oz of 0.57 lb/gal	28 fl oz/A	0.125	Crabgrass, goosegrass	Zoysiagrass only. **Do not** apply to bermudagrass or other warm-season turfgrasses. Consult label for recommended rate according to weed stage at application. **Do not** mow within 24 hours after application.
fluazifop-p-butyl Zoysiagrass Tall fescue	0.07 - 0.14 oz of 2 lb/gal	3 - 6 oz of 2 lb/gal	0.047 - 0.093	Bermudagrass suppression and control of some annual grasses	Higher rates can cause discoloration. Avoid summer applications. Repeat applications can be made every 28-30 days. Use nonionic surfactant at the rate of 1 quart per 100 gallons. Not for use on residential lawns. Do not use more than 4 ounces per acre on zoysiagrass.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
fluroxypyr Bermudagrass Centipedegrass Zoysiagrass St. Augustinegrass	0.25 - 0.5 fl oz of 1.5 lb/gal	11 - 21 fl oz/A of 1.5 lb/gal	0.25 - 0.5	Annual and perennial broadleaf weeds	Do not use on golf greens or tees. Do not use within drip lines of trees and shrubs. Do not apply more than 0.66 pint per acre to bermudagrass or St. Augustinegrass.
foramsulfuron Bermudagrass Zoysiagrass (consult label for tolerant varieties)	0.2 - 0.6 fl oz of 0.19 lb/gal	8.8 - 26.2 fl oz	0.013 - 0.039	Annual bluegrass, ryegrass, and Poa trivialis	**Do not** use more than 0.4 fluid ounce per 1,000 square feet to remove ryegrass or other overseeding grass from bermudagrass. **Do not** use more than 1.25 ounce per 1,000 square feet per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 2 weeks prior to overseeding with perennial ryegrass.
halosulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.03 oz of 75 DF	1.33 oz/A	0.062	Purple and yellow nutsedge Green kyllinga (suppression)	**Do not** use on golf-putting greens. Apply after nutsedge has reached 3- to 8-leaf growth stage. Use 0.5%, by-volume, nonionic surfactant for broadcast applications. A second treatment may be needed 6 to 10 weeks after the initial application. **Do not** make more than two applications with a total use rate not to exceed 0.125 pound per acre per year. **Do not** mow turf for 2 days before or 2 days after application. **Do not** apply to centipedegrass prior to tillering.
imazaquin Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.5 - 1 fl oz of 1.5 lb/gal or 0.13 - 0.26 oz of 70 DG	21 - 42 fl oz/A of 1.5 lb/gal or 5.7 - 11.4 oz/A of 70 DG	0.25 - 0.5	Purple nutsedge, yellow nutsedge, other sedges, and wild garlic	Apply when weeds are actively growing. May be tank mixed with MSMA when used in bermudagrass and zoysiagrass. **Do not** use on golf greens.
mecoprop Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	3 - 5 tbsp of 2 lb/gal	2 - 3.5 qt/A	1 - 1.75	Clovers, spurges	May be used on golf greens. Acts slower than 2,4-D.
mesotrione Centipedegrass St. Augustinegrass Tall fescue Perennial ryegass	0.09 - 0.18 oz of 4 lb/gal	4 - 8 oz of 4 lb/gal	0.125 - 0.25	tufted lovegrass, crabgrass, goosegrass, broadleaf weeds	Apply to St. Augustine on sod farms only. May require second application for control of some annual grasses. Use surfactant at the rate of 1 quart per 100 gallons.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
metribuzin Bermudagrass	0.2 - 0.25 oz of 75 DF or 0.5 - 1 tbsp of 4 lb/gal	8 - 10.6 oz/A of 75 DF	0.37 - 0.5	Many winter annual broadleaf weeds	Use on dormant bermudagrass only. See below for tank-mix with MSMA for goosegrass control. Follow all label precautions.
metsulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.006 - 0.023 oz of 60 DF	0.25 - 1 oz/A of 60 DF	0.009 - 0.04	Bahiagrass and many winter and summer broadleaf and grassy weeds, and for removal of overseeded perennial ryegrass	'Meyer' and 'Emerald' zoysiagrass only. **Do not** apply more than 0.5 ounce per acre to centipedegrass. Some discoloration to turfgrasses may occur. Use of a surfactant at 1 quart per 100 gallons of solution will increase performance, but it may also increase chlorosis of turfgrasses.
MSMA Bermudagrass Zoysiagrass	1 - 2 fl oz of 6 lb/gal	1.3 - 2.6 qt/A of 6 lb/gal	2 - 4	Crabgrass, dallisgrass	Repeat applications at 7- to 10-day intervals are necessary. Best results are obtained when adequate soil moisture is present. Apply only when temperatures are above 80 ºF. **Do not** use on newly established turfs until turfgrasses are well established. Read the product label for restrictions.
MSMA + metribuzin (Tank mix) Bermudagrass	1 fl oz/A of 6 lb/gal + 0.9 g of 75 DF	1.3 qt/A of 6 lb/gal + 1.33 oz/A of 75 DF	2 + 0.0625	Goosegrass	Use only on bermudagrass turf on golf course fairways and commercial sod farms. Add 0.25% by volume of an agricultural grade surfactant. Repeat application in 7-10 days and delay mowing 3 days following each application for maximum control. Read the product label for restrictions.
pronamide Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.36 - 0.73 oz of 50 WSP	1 lb/A of 50 WSP	0.5 -1.5	Annual bluegrass	Apply November to February, best before January, and apply 0.5 to 1 inch of water immediately after application. **Do not** apply chemical to overseeded turf. **Do not** apply where lateral water movement may carry chemical to overseeded turf. **Do not** apply a wetting agent within 14 days before or after application.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
quinclorac Bermudagrass Zoysiagrass	0.367 oz of 75 DF or 1.45 fl oz of 1.5 lb/gal liquid	1 lb of 75 DF or 64 fl oz/A of 1.5 lb/gal liquid	0.75	2- to 3-leaf crabgrass and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
	0.245 + 0.245 + 0.245 oz of 75 DF or 1 + 1 + 1 fl oz of 1.5 lb/gal liquid	0.67 + 0.67 + 0.67 lb of 75 DF or 43 + 43 + 43 fl oz of 1.5 lb/gal liquid	0.5 + 0.5 + 0.5	Torpedograss suppression	Best control of torpedograss can be achieved with 0.5 pound of active ingredient per acre applied three times at 2- to 3-week intervals. Use with methylated seed oil at 1.5 pints per acre.
quinclorac + MCPP + dicamba Bermudagrass Zoysiagrass	1.45 fl oz	64 fl oz	1.225	2- to 3-leaf crabgrass, torpedograss suppression, and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
quinclorac + sulfentrazone Bermudagrass Zoysiagrass	0.367 - 0.735 oz of 75 DF	16 - 32 oz of 75 DF	0.75 to 1.5	2- to 3-leaf crabgrass, torpedograss suppression, many broadleaf weeds, kyllinga, and some sedges	Good spray coverage is recommended for control of sedges. Use of surfactant is not recommended.
rimsulfuron Bermudagrass	0.6 g	1 - 2 oz/A of 25 DF	0.0156 - 0.0312	Annual bluegrass, overseeded perennial ryegrass, and broadleaf weeds	For use in non-overseeded bermudagrass, including sod farms, golf courses, professionally managed college and professional sports fields, and industrial and commercial lawns. Not for use in residental lawns. Lateral movement may occur and injure overseeded grasses downslope from the treated area. Use lower rate for removing overseeded perennial ryegrass. May be applied up to 2 weeks prior to overseeding perennial ryegrass.
sethoxydim Centipedegrass	0.5 - 0.75 fl oz of 1 lb/gal	23 - 36 fl oz/A of 1 lb/gal	0.18 - 0.28	Crabgrass and other annual grasses	Use in centipedegrass only. Apply no sooner than 3 weeks after greenup. **Do not** mow within 7 days before or after application. **Do not** apply to seedling centipedegrass until new stolons are 3 inches long. **Do not** exceed 3 pints per acre per season. Professional applicators only.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
simazine Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 -2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Uptake only through soil. Irrigate following application to activate.
sulfentrazone Bermudagrass St. Augustinegrass Centipedegrass Zoysiagrass Bahiagrass	0.09 - 0.27 oz of 4 lb/gal	4 - 12 oz of 4 lb/gal	0.125 - 0.375	sedges, kyllinga, and broadleaf weeds	Apply to established grasses or after two mowings on newly seeded or sodded turf that has an established root system. Do not add surfactant. Not for use on golf course greens or tees.
sulfosulfuron Bermudagrass St. Augustine Centipedegrass Zoysiagrass	0.5 g of 75WG	0.75 - 2 oz of 75WG	0.035 - 0.094	Sedges, kyllinga, annual bluegrass, lawnburweed, and other winter annuals	Apply no sooner than 7 days prior to overseeding perennial ryegrass. Use nonionic surfactant at the rate of 1 quart per 100 gallons. May be applied to commercial or residential turf. **Do not** apply to greens.
sulfentrazone + prodiamine Bermudagrass Centipedegrass Zoysiagrass	0.413 - 0.551 fl oz	18 - 36 fl oz	0.57 - 1.125	Annual grasses	For preemergence and early postemergence of annual grasses such as crabgrass. Do not exceed 1.125 pounds of active ingredient per year. Do not apply to greens or tees. Do not exceed 24 fluid ounces per acre on Centipedegrass or Zoysiagrass.
trifloxysulfuron Bermudagrass Zoysiagrass	0.008 - 0.013 oz of 75 WG	0.33 - 0.56 oz/A	0.015 - 0.026	Annual bluegrass, ryegrass, nutsedges, kyllinga, broadleaf weeds, and torpedograss suppression	Use low rate to remove overseeded perennial ryegrass and Poa trivialis to aid in spring transition of bermudagrass. Use surfactant at a rate of 1 quart per 100 gallons. **Do not** use more than 1.7 ounces per acre per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 3 weeks prior to overseeding perennial ryegrass.
		0.1 - 0.3 oz/A		Overseeded perennial ryegrass and roughstalk bluegrass	

IMPROVED RIGHTS-OF-WAY/INDUSTRIAL

Oust Precautions —

1. Avoid applying during rainy periods or when soils are water saturated.
2. Do not apply on newly planted areas. Spray only on good stands that are in their third year of growth.
3. Do not spray when ground is frozen.
4. Do not spray near irrigation canals, ditches, etc.
5. Do not spray areas that will be planted to crops or apply where lateral water movement from treated areas to crop areas may occur.
6. Spring or summer applications of Oust may cause "brownout" and/or bermudagrass kill. Public complaints may result.

Situation and Application Timing	Herbicide	Rate/A	Comments
FALL			
Sept. 15 to Oct. 1	pendimethalin	2 - 4 lb ai/A	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
	prodiamine	0.75 - 1 lb ai/A	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
LATE FALL			
October to December	2,4-D	1 - 2 lb ae/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	aminopyralid	7 fl oz	This treatment is for winter broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	aminocyclopyrachlor + chlorsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Can be used on bermudagrass and bahiagrass roadsides.
	aminocyclopyrachlor + metsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	clopyralid	0.25 - 1.33 pt	This treatment is for control of broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	dicamba	0.5 - 1 lb ai/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	diflufenzopyr + dicamba	4 - 8 oz/A	This treatment is for control of broadleaf weeds. Add 1 quart of surfactant per 100 gallons of spray.
	diuron	2 - 3 lb ai/A	Diuron controls Italian ryegrass (which is resistant to Oust) and some other winter annuals.
	glyphosate	0.375 - 0.75 lb ae/A	Applications can be made using 16 fluid ounces per acre of a 4# glyphosate during October while bermudagrass is actively growing. Once bermudagrass is completely dormant, rates can be increased to 32 fluid ounces per acre using a 4# glyphosate.
	glyphosate + 2,4-D	48 - 64 fl oz	This treatment provides broadleaf and grass control. The low rate should be used until bermudagrass is dormant.
	sulfometuron	1 - 2 oz	Do not add surfactant. Sulfometuron controls winter annuals and fescue and suppresses early summer annuals. Fall applications, compared with later applications, permit earlier spring greenup of bermudagrass and reduce chance of injury to nearby crops. Do not spray areas that will be planted to crops.
	triclopyr	0.33 - 1.5 lb ae/A	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.

Situation and Application Timing	Herbicide	Rate/A	Comments
WINTER			
January to March	aminopyralid	7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	aminocyclopyralid + chlorsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period.
	aminocyclopyralid + metsulfuron	4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	chlorsulfuron 75 DF	0.5 to 1 oz/A	For broadleaf weed control. Add 1 of quart of surfactant per 100 gallons of spray. Can be used in bermudagrass and bahiagrass.
	diflufenzopyr + dicamba	4 - 8 oz/A	For broadleaf weed control. Add 1 quart surfactant per 100 gallons of spray.
	glyphosate + 2,4-D	48 - 64 fl oz	Controls winter annuals, tall fescue, and some weeds that may be tolerant to Oust. Apply Campaign before bermudagrass greenup initiates in the spring or injury may result.
	glyphosate	0.56 - 0.75 lb ae/A	Controls winter annuals, tall fecue, and some weeds that may be tolerant to Oust. Will control annual ryegrass, which has developed resistance to Oust. Apply glyphosate before bermudagrass greenup initiates in the spring or injury may result. Consult the label to determine if surfactant is needed.
January to Feb. 15	imazapic 2L	8 - 12 fl oz	Imazapic 2L controls tall fescue, Italian ryegrass, and winter annuals. Avoid applying Plateau after bermudagrass initiates greenup.Bahiagrass should be completely dormant or injury will occur. Do not exceed 12 ounces per acre in 1 year. See the label for recommended additive.
	sulfometuron 75 DF	0.5 oz	Controls winter annuals and provides tall fescue suppression. Less likely to cause delay in bermudagrass greenup than March-April treatment.
SPRING			
March and April	aminopyralid	7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	diflufenzopyr + dicamba	4 - 8 oz/A	For broadleaf weed control. Add 1 quart of surfactant per 100 gallons of spray. Apply in early spring prior to emergence of susceptible crops.
	sulfometuron 75 DF	0.5 oz	Add 0.5% v/v surfactant. Begin application to actively growing weeds in late winter to early spring. Controls a wide variety of winter and spring annuals, including bedstraw and corn speedwell and suppresses tall fescue. When 0.5 ounce of Oust is used, less delay in bermudagrass greenup will likely be observed. If brownout or delay in bermudagrass greenup is not acceptable, refer to the fall Oust application.
	triclopyr 2,4-D dicamba clopyralid	0.33 - 1.5 lb ae/A 1 - 2 lb ae/A 0.5 - 1 lb ai/A 0.25 - 1.33 pt	Apply to cover weeds using 30 to 50 gallons of spray per acre. Add 2 quarts of surfactant to each 100 gallons of spray per acre. Apply in early spring prior to emergence of susceptible crops. Controls emerged broadleaf weeds.
Tall fescue seedhead suppression	sulfometuron 75 DF	0.25 oz	Apply before seedheads emerge in spring. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control tall fescue.

Situation and Application Timing	Herbicide	Rate/A	Comments
SUMMER			
Bermudagrass release			The following treatments can follow spring or fall Oust applications if needed or may be used alone.
Annual weed and grass control plus Johnsongrass	Nicosulfuron + metsulfuron	1.25 - 1.5 oz	This treatment controls annual and perennial grasses, including rhizome johnsonrass, itchgrass, and bahiagrass. It also provides suppression of vaseygrass and foxtails. Use 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate (COC). Use of COC may increase chances of bermudagrass injury. The treatment will control many broadleaves, as well, such as pigweeds and wooly croton. Do not use on bahiagrass or fescue.
Annual weeds and johnsongrass	sulfometuron 75 DF	0.5 - 1 oz	Use low rate to control most annuals and high rate where johnsongrass is a problem. Poor control of vaseygrass, broomsedge, and dallisgrass.
Annual weeds and johnsongrass	imazapic	8 - 12 fl oz	Controls johnsongrass, crabgrass, common ragweed, and provides suppression of bahiagrass and other weeds. Do not exceed 12 ounces per acre in one year. See label for recommended additive.
late spring to summer	MSMA — 6 lb/gal or 6.6 lb/gal	3.3 - 4 pt or 3 - 3.6 pt	Same as above. Use on well-established bermudagrass to control most weed species including johnsongrass. Add surfactant as above.
late spring to summer	glyphosate	0.28 - 0.375 lb ae/gal	Use on well-established bermudagrass to suppress johnsongrass and control annual and perennial grass weeds, such as crabgrass, knotroot foxtail, tall fescue, and dallisgrass. Some discoloration of bermudagrass may occur. Consult the label to determine if surfactant is needed.
Johnsongrass	sulfosulfuron 75 DF	1.33 oz	For johnsongrass control in bermudagrass and bahiagrass highway rights-of-way and similar areas. Highly selective for johnsongrass control with little or no jnjury to these turfgrasses. Consult label for other weeds controlled.
Bahiagrass seedhead suppression	sulfometuron 75 DF	0.5 oz	Apply before seedheads emerge in spring or soon after mowing in summer. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre of surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control bahiagrass.
	imazapic 2L	2 - 3 fl oz	Provides only seedhead suppression of bahiagrass. Do not expect weed control. Raise mowing height to leave adequate existing foliage since new growth will be suppressed.
	glyphosate	0.14 - 0.18 lb ae/A	Apply before seedheads emerge in spring or soon after mowing in summer. Will provide approximately 45 days of vegetative growth and seedhead suppression. Consult the label to determine if surfactant is needed.
Broomsedge suppression	(See above — SUMMER Bermudagrass Release — annuals and many perennials).		
Hemp sesbania control	Linuron 4L	0.5 lb ai/A 1 pt	Add 2 quarts of surfactant per 100 gallons of spray. Apply 40 to 50 gallons of spray per acre to ensure good coverage of emerged sesbania.
	metsulfuron	0.5 to 1 oz/A	Add 1 quart of surfactant per 100 gallons of spray. **DO NOT** use in bahiagrass.

VEGETABLE CROPS

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
SPECIAL PRECAUTION: *Many vegetable crops, especially cucumbers, are sensitive to residual herbicides like substituted ureas and traizines. Use care following these chemicals with susceptible crops for up to one year.*				
Beans — lima and snap				
bentazon *Basagran 4 SL*	0.5 to 1 lb ai 1 to 2 pt	Cocklebur, yellow nutsedge, and velvetleaf.	After beans have 1 to 2 expanded trifoliate leaves.	Sequential applications 7 to 10 days apart may be needed for control. Do not apply more than 2 quarts per acre per season or within 30 days of harvest. Do not use crop oil concentrate with applications on snap or pole beans.
metolachlor *Dual Magnum* *Dual Magnum II*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in- corporate in top 2 inches of soil within 14 days before planting.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals, top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray mix.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent beans.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Beans — lima only				
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or after planting.	Pursuit DG may be tank-mixed with grass herbicides.
Beans — snap only				
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence	Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vege-table production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Erratic control of pigweed. Thorough agitation required.
quizalofop *Assure II*	0.04 to 0.08 lb ai 6 to 12 oz	Annual and perennial grasses.	After grasses emerge.	Add 1 quart crop oil concentrate per 100 gallons. Do not apply within 15 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Cantaloupe and Watermelon				
bensulide *Prefar*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 months restriction for crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	**Watermelon only.** Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not apply any later than 2 days after planting. Do not apply under mulch.**
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses, plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rates on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate, apply under plastic mulch or crop covers, broadcast over transplants, or make more than one application per season.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed plus others.	Pre.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
	0.38 to 0.56 oz ai 0.5 to 0.75 oz		Post.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	**Watermelons or melons above**. Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month-period. Do not apply overtop of plastic mulch or to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
naptalam *Alanap*	2 to 3.5 lb ai 4 to 7 qt	Some broadleaf weeds.	Immediately after planting.	Weed control erratic.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	3- to 4-true leaf stage.	Apply as a directed spray be-tween rows and incorporate.

Cole Crops – broccoli, cabbage, and cauliflower

clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.3 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	After transplanting.	**Cabbage only.** Place transplant roots below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
clopyralid *Stinger 3 EC*	0.09 to 0.187 lb ai 0.25 to 0.5 pt	Emerged broadleaf weeds.	Post.	Will control most legume weeds. Do not apply within 30 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At seeding or transplanting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
oxyfluorfen *Goal*	0.25 to 0.5 lb ai 1.25 to 2.5 pt	Small-seeded annual broadleaf.	After soil preparation prior to transplanting.	Severe crop response may result if transplants are under stress.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses.	Prior to planting.	Apply and incorporate before planting.
Cucumber				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 month restriction for crops not labeled.
bensulide *Prefar 4E* + naptalam *Alanap-L*	4 to 6 lb ai 4 to 6 qt + 2 to 4 lb ai 4 to 8 qt	Germinating annual grasses and broadleaf weeds.	Preplant incorporated.	**Do not** plant uncleared crops for 18 months. Use lower rates on lighter soils.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.38 lb ai 0.4 to 1 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not** apply any later than 2 days after planting. **Do not** apply under mulch.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Pre.	Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
			Post.	Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
naptalam *Alanap-L*	2 to 3.5 4 to 7 qt	Broadleaf weeds.	Immediately after planting.	Weed control erratic.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Greens — collard, kale, mustard, and turnip				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not harvest within 14 days of harvesting greens or within 30 days of root harvest.
clopyralid *Clopyr AG*	0.187 lb ai 0.5 pt	Emerged broadleaf weeds.	Post.	**Turnip greens only.** Do not make more than one application per season. Allow at least 15 and 30 days between application and harvesting turnip tops and roots, respectively.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation is required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred). Use only for kale and mustard.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Use only for collards and turnips. Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Annual and perennial grasses.	After grass emergence.	**Do not** apply to turnips. Use 2 pints of crop oil concentrate per acre. Do not apply less than 45 days before harvest.
trifluralin *Treflan 4E*C	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	**Do not** use on turnip greens except for processing greens.
Okra				
carfentrazone *Aim 2EC*	0.008 to 0.025 lb ai 0.5 to 1.6 oz	Wide spectrum of broadleaf weeds (2 to 4 inches).	Hooded sprayer.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Coverage is essential. Hooded sprayer must totally enclose spray pattern to prevent crop damage.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Onion				
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 10 lb	Germinating grasses, purslane, wild verbana, chickweed.	At seeding, transplanting, and/or layby.	Apply to weed-free soil. Thorough agitation required.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	**Dry bulb only.** Use nonionic surfactant at 0.25% v/v. Do not apply within 45 days of harvest.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
oxyfluorfen *Goal* 1.6 lb/gal	0.12 to 0.5 lb ai 0.6 to 2.5 pt	Broadleaf weeds.	When onions have at least 2 true leaves.	Multiple treatments may be applied. **Do not** exceed 0.5 pound (2.5 pints) per acre per year. Use only on dry bulb onions.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Apply preemergence as a broadcast treatment when onions have 2 to 9 true leaves.	**Do not** apply to green, bunching onions or leeks. Do not incorporate or injury will occur. Do not exceed 3.6 pints per acre per season or apply within 45 days of harvest.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
trifluralin *Treflan 4EC*	0.375 to 0.62 lb ai 0.75 to 1.25 pt	Grasses, pigweed, purslane.	Up to 60 days before harvest.	Postplant as directed. Spray between rows.
Pepper				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
clomazone *Command 3ME*	0.5 to 1 lb ai 0.67 to 2.67 pt	Annual grasses and some broadleaf weeds.	Soil application prior to seeding or transplanting.	All peppers (including bell, hot, pimento, and sweet, except banana). Some varieties may be injured. Seeds or transplants should be placed below the treated barrier. If stand failure occurs, peppers may be replanted, but do not make a second application. **Do not** exceed 2 pints per acre per season. **Do not** graze, harvest for food, or feed cover crops planted less than 9 months following Command application. **Do not** apply within 1,500 feet of towns, subdivisions, commercial subdivisions, commercial vegetable or fruit production, commercial nurseries, or greenhouses.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	4 to 6 weeks after transplanting or direct seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 lb ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. **Do not** apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. **Do not** apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each l00 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses, pigweed, purslane.	Before transplanting.	Apply and incorporate before transplanting.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Potatoes, Irish				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At planting or up to 9 weeks after planting.	Apply to weed-free soil. Thorough agitation required.
EPTC *Eptam-7E*	3 lb ai 3.5 pt	Grasses, pigweed, nutsedge (stunts swinecress).	Preplant, postplant, postemergence.	See label for specific use in structions. **Do not** let EPTC come in contact with seed piece.
flumioxazin *Chateau SW 51%*	0.047 lb ai 1.5 oz	Several broadleaf weeds.	After hilling, preemergence to weeds.	A minimum of 2 inches of soil must cover vegetative portion of potato plant or crop injury may occur.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
linuron *Lorox 50DF*	0.5 to 1 lb ai 1 to 2 lb	Annual grasses and broadleaf weeds.	Pre.	Apply before crop emergence. Plant seed at least 2 inches deep. Use lower rates on coarse textured soils, higher rates on medium or fine textured soils. Add 0.5% by volume nonionic surfactant if emerged weeds are present.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Pre- or postplant incorporated or preemergence after final drag off.	Cool, wet conditions after application may delay maturity and/or reduce yield of Superior and other early- maturing varieties.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	After planting and before crop emergence or after crop emergence for certain white-skinned varieties.	Use lower rates on sandy soil. **Do not** use postemergence on early-maturing, smooth-skinned white or red varieties. **Do not** plant treated area to crop other than potatoes for 1 year after treatment. **Do not** plant sensitive crops such as onions, cole crops, or cucurbit during the growing season following application of metribuzin.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	After planting but before potatoes and weeds emerge.	Incorporation not required if adequate rainfall or irrigation for crop and weed emergence occurs within 7 days.
rimsulfuron *Matrix DF 25%*	0.016 lb ai 1 oz	Several broadleaf weeds and select grasses.	After hilling to clean newly prepared seedbed, preemergence to weeds.	Needs rainfall for activation within 5 days. Do not apply within 60 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Pumpkin				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Incorporate 1 to 2 inches deep. Has 18 months restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Add crop oil concentrate at 1% by volume of finished spray. Do not exceed 8 ounces per acre per application or 32 ounces per acre per season. Do not apply within 14 days of harvest.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Southern peas				
bentazon *Basagran* 4 lb/gal	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur.	Postemergence after at least three nodes have developed on peas.	Some yellowing, bronzing or speckling of leaves may occur. **Do not** apply more than 1 pound per acre of bentazon in one season. Use low rate for 2- to 6-leaf-stage cocklebur and high rate for 6- to 10-leaf-stage cocklebur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or at planting.	Pursuit DG may be tank-mixed with a registered grass herbicide.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, incorporate in top 2 inches of soil within 14 days before planting.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporated up to 60 days before planting.	**Do not** apply preemergence to southern peas as injury may occur. If stand failure occurs, any crop registered for Prowl 3.3EC preplant incorporated may be replanted, but do not work soil deeper than herbicide incorporation zone.
quizalofop *Assure II 0.88 EC*	0.04 to 0.08 lb ai 6 to 16 oz	Emerged annual and perennial grasses.	Post.	Do not apply within 30 days of harvest. Add 1 gallon of crop oil concentrate or 1 quart of nonionic surfactant per 100 gallons of spray mix. Crop oil concentrate may cause leaf speckling under hot and humid conditions.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent peas.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	1 to 3 weeks before planting.	Apply and incorporate before planting.
Squash				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Apply and incorporate before planting. Has 18-month restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.33 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before seeding or just before transplanting or to row middles between plastic covered rows.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	When plants have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation is required.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
Sweet corn				
atrazine 4L 90% DF	2 lb ai 2 qt 2.2 lb	Annual grasses, pig weed, purslane, morningglory.	Immediately after planting.	Atrazine gives better results where soil moisture is not limited. Provides poor control of signalgrass.
bentazon *Basagran 4 lb/gal*	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur, tall morningglory, and other broadleaf weeds.	Postemergence, as directerd spray, after corn is at least 12 inches tall.	**Do not** apply overtop or injury may occur. Do not apply within 3 weeks before tasseling. Add 2 pints of nonionic surfactant per 100 gallons of spray.
carfentrazone *Aim*	0.008 lb ai 0.33 oz	Cocklebur, ragweed, pigweed, smartweed, and prickly sida.	Preplant.	Sweet corn can be treated anytime between 30 days before planting until corn has eight collars. Apply to postemerged weeds only. Add 1 quart of nonionic surfactant per 100 gallons of spray solution.
dimethenamid *Outlook*	0.75 to 1.5 lb ai 1 to 2 pt	Annual grasses and small-seeded, broadleaf weeds.	Immediately after planting.	May be tank mixed with atrazine.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
dimethenamid + atrazine *Guardsman*	0.7 to 1.3 + 0.8 to 1.5 lb ai 2.5 to 4.5 pt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or early postemergence.	**Do not** harvest within 50 days after treatment. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilizer as injury may occur. Do not apply over the top of corn more than 8 inches tall.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Permit*	0.5 oz ai 0.67 oz	Nutsedge, cocklebur, pigweed, ragweed, and smartweed.	Post.	Apply over the top or with drop nozzles anytime between spike and layby. All cultivars have not been tested for tolerance. Check with seed supplier for tolerance. Do not apply to 'Jubilee' sweet corn. Do not make more than two applications per year or exceed 0.67 ounce per application. **Do not** apply to sweet corn previously treated with a soil applied organophosphate insecticide or apply an organophosphate insecticide within 7 days before or 3 days following Sempra application. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in-corporate in top 2 inches of soil within 14 days before planting.
metolachlor + atrazine *Bicep II or Bicep II Magnum*	0.95 to 1.91 lb ai + 1 to 2 lb ai 1.5 to 3 qt 1.3 to 2.6 qt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or postemergence broadcast or directed spray.	**Do not** exceed 2.4 quarts as soil-applied treatment if soils contain less than 3% organic matter. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilzer as injury may occur. Do not graze or feed treated forage within 30 days after application. Do not apply over the top of corn more than 8 inches tall.
nicosulfuron *Accent 75 DF*	0.5 oz ai 0.67 oz	Johnsongrass and other annual weeds.	Postemergence, after sweet corn emergence up to 12-inch sweet corn or up to and including five leaf collars.	For corn 12 to 18 inches, apply with drop nozzles. **Do not** apply to sweet corn taller than 18 inches or with six or more leaf collars. **Do not** exceed one application per year. Some sweet corn varieties may be less tolerant than others
pendimethalin *Prowl H_2O* atrazine (several) 4L or 90DF	0.5 to 1.5 lb ai 1 to 3.2 pt 2 lb ai 2 qt or 2.2 lb	Annual grasses and broadleaf weeds.	Early postemergence from spike to 4-leaf corn but before weeds exceed 1 inch tall.	**Do not** apply (1) Prowl 3.3EC alone or with other products, (2) preplant incorporated, (3) Prowl H_2O + atrazine in liquid fertilizer.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply over the top of corn. **Do not** apply within 30 days of harvest. **Do not** apply more than 1 pint per acre. Direct spray to lower 10 inches of corn stalks.

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Sweet potato				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3 ME*	0.48 to 1.25 lb ai 1.33 to 3.33 pt	Annual grasses and certain broadleaf weeds.	Immediately prior to or after transplanting.	**Do not** apply within 95 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	At transplanting or up to 6 weeks after transplating.	Apply to weed-free soil. Thorough agitation is required.
fluazifop Fusilade DX	0.094 to 0.25 lb ai 6 to 16 oz	Grasses.	After grass emergence.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Do not harvest within 55 days of application.
flumioxazin *Valor SX*	0.032 to 0.08 lb ai 1 to 2.5 oz	Certain broadleaf weeds.	2 to 5 days prior to transplanting.	**Do not** apply over the top of sweet potatoes. Do not use greenhouse-grown transplants. Tank-mix with Command only if applied pretransplant.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1 lb ai 1 to 1.33 pt	Annual and yellow nutsedge, annual grasses, and some broadleaf weeds.	Posttransplant to slips and preemergence to weeds.	Use only on field-grown 'Beauregard' transplants. There is a risk of injury to transplants if heavy rainfall occurs shortly after application. Do not apply so that the herbicide is allowed to be concentrated over the transplant row. Do not incorporate after application. Do not apply in irrigation water. Make only one application to sweet potatoes per growing season. **NOTE (State Label 24c)**
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
Tomato				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	After grasses emerge.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	4-6 weeks after transplanting or direct-seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation is required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
halosulfuron *Sandea 75 DF*	0.024 to 0.036 lb ai 0.5 to 0.75 oz	Nutsedges and some broadleaf weeds.	Pre.	Use on transplant tomatoes only. Apply under plastic mulch for nutsedge suppression. Sandea is more effective when applied to emerged nutsedges. Wait at least 7 days before transplanting into treated areas.
	0.024 to 0.036 lb ai 0.5 to 0.75 oz		Post.	Use on transplant tomatoes only. Apply to transplants that are established and actively growing. Do not apply sooner than 14 days after transplanting.
	0.38 to 0.768 oz ai 0.5 to 1 oz		Apply in row middles before vining on emerged 4- to 8-inch nutsedges.	Use on transplant and direct-seeded tomatoes. Avoid contact with tomato foliage or minimize deposition on plastic mulch. Do not exceed 2 ounces per acre per 12-month period. Do not apply to tomatoes treated with a soil-applied organophosphate insecticide. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1.91 lb ai 1 to 2 pt	Annual grasses and some broadleaf weeds.	Preplant post-directed.	In plasticulture, apply to preformed beds prior to applying plastic mulch. Postdirect to transplants after first settling rain or irrigation event.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	Postemergence when tomatoes have 5 to 6 leaves and before weeds are more than 1 inch tall.	Apply specified dosage in single or multiple applications in a minimum of 20 gallons of water and 14 days between applications. **Do not** treat seeded or transplanted tomatoes until plants have reached the 5- to 6-leaf stage or until transplants have recovered from transplant shock and new growth is evident. **Do not** apply within 3 days after periods of cool, wet, or cloudy weather or crop injury will occur. **Do not** apply within 24 hours of other pesticide applications.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
rimsulfuron *Matrix DF 25%*	0.016 to 0.031 lb ai 1 to 2 oz	Several broadleaf weeds and select grasses.	Postdirected to young, actively growing weeds (less than 1 inch).	Add nonionic surfactant at 0.25% v/v. For residual control, this treatment needs rainfall for activation within 5 days. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast Plus 1.0E*	0.2 to 0.3 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifloxysulfuron *Envoke 75%*	0.004 to 0.009 lb ai 0.10 to 0.20 oz	Yellow nutsedge, cocklebur, morningglory, and several other broadleaf weeds.	Wait 2 weeks after transplanting before application. Post-directed to young, actively growing weeds. Tomato plants should be large enough to avoid spray contact with growing point.	This treatment is only for transplanted tomatoes grown in plastic. Add nonionic surfactant at 0.25% v/v. Do not apply if treated with a soil-applied organophosphate (OP) insecticide, and wait 21 days before or 7 days after foliar OP treatment. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines. **NOTE (State Label 24c).**
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, and purslane.	Before transplanting.	Incorporate 1 to 1.5 inches.

ORNAMENTAL CROPS

Many manufacturers' labels list tolerant herbaceous and woody ornamentals species by common name. This listing may apply to one species or all species within a genus. This information is believed to be correct according to the manufacturer's label at the time this publication was prepared. However, species may be added to or deleted from labels at any time. ALWAYS CHECK THE LABEL AT THE TIME OF USE to make sure the herbicide is labeled for the species on which you intend to use it.

Always check label for specific precautions and application directions. Proceed cautiously and limit acreage treated until you have gained firsthand experience in the use of herbicides.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
SOIL STERILANTS *(Landscape beds for flowers, shrubs, liners, and potting medium)*					
metham	1 qt 4 lb/gal formulation	200-400	21-28 days before planting or transplanting.	Dormant weed seed, vegetative structures of perennial weeds, and certain soil disease organisms.	Mix with water and apply uniformly to freshly prepared moist soil when temperature is above 60 °F. Soil should be moist enough to form a crumbly ball. Sprinkle immediately with sufficient water to seal soil, approximately 0.5-inch of water. The addition of an airtight cover greatly increases effectiveness. Cover should not be disturbed for at least 14 days. Work soil to depth of 2 inches at least 4 days before planting or transplanting. Spread potting soil out in 4-inch layer and treat (sprinkler can) with 1 pt per 100 square feet. Add another 4-inch layer and repeat treatment. Sprinkle top layer with sufficient water to seal or cover with gas proof cover. **CAUTION**: **Do not** get metham in your eyes or on your skin, clothing, or shoes. If application requires walking over the area, wear rubber boots.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
methyl bromide	1-3 lb	435-1,305	4 days before planting or transplanting.	Dormant weed seed, vegetative structures of perennial weeds, nematodes, and fungi.	Soil temperature should be above 60 °F and should be moist but not saturated with water. Spade, rotary till, or plow soil about 8-10 inches deep. Release chemical under gas-proof cover. Cover should be sealed tightly around edges and suspended above soil by inverted pots, U-shaped tubes, inflation (seal three sides and pump up cover by up and down motion of loose end and then seal) or other suitable support. Inject into pan, not directly onto soil. **CAUTION: METHYL BROMIDE IS EXTREMELY POISONOUS. Do not** breathe vapor or let it get on your skin. Allow cover to remain in place for 48 hours. Remove cover and allow 2 days before planting or transplanting.
steam			1-2 days before planting or transplanting.	Annual and perennial weeds.	Spade or rotary till soil to a depth of 10-12 inches. Apply steam under a suitable cover until soil reaches 140-150 °F in the coldest part of the bed. Maintain at 140 °F for 2 hours (30 minutes for potting media). Allow soil to cool before planting. Leach soil thoroughly immediately after planting.
BULBS, CORMS, TUBERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan. For use on tulips and narcissus only.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
napropamide	2.88-1.48 oz Devrinol 5G	4-6	After transplanting.	Grassy weeds.	**Consult list of plant species on which Devrinol 5-G Ornamental can be used.** Apply Devrinol 5-G Ornamental as a broadcast application over containers only. Normal irrigation or rainfall should provide sufficient water for satisfactory control.
oryzalin	0.05 - 0.1 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to gladiolus bulbs larger than l inch in diameter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** In the spring, **do no**t apply to tulip plants that have emerged to a height greater than 0.75 inch. Deep plow prior to planting any crop after this use.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Gladioli corms less than 1 inch in diameter may be injured by preplant applications of Treflan G.
HERBACEOUS ANNUAL FLOWERING PLANTS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan.
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches. **Do not** use on button pink, carnation, pansy, phlox, sweet william, or alternanthera.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks af ter transplanting. Beds must be clean at time of treatment.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days.
napropamide	2.88-1.48 oz Devrinol 5G	4-6	After transplanting.	Grassy weeds.	**Consult list of plant species on which Devrinol 5-G Ornamental can be used.** Apply Devrinol 5-G Ornamental as a broadcast application over the containers. Normal irrigation or rainfall should provide sufficient water for satisfactory control. **Do not** use on soils containing more than 10% organic matter.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5 - inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been observed on a few species with no reduction in vigor or growth.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
HERBACEOUS PERENNIAL FLOWERING PLANTS AND PERENNIAL GROUNDCOVERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Do not apply peat moss before treating with Betasan.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks after transplanting. Beds must be clean at time of treatment.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Apply after soil around plant roots has settled.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germina tion of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.
metolachlor	2 tbsp Pennant 7.8E/gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. **Do not** use on ornamental perennial monocots.
napropamide	2.88-1.48 oz Devrinol 5G	4-6	After transplanting.	Grassy weeds.	**Consult list of plant species on which Devrinol 5-G Ornamental can be used.** Apply Devrinol 5-G Ornamental as a broadcast application over the containers. Incoporate immediately by tillage, irrigation, or rainfall. Normal irrigation or rainfall should provide sufficient water for satisfactory control. **Do not** use on soils containing more than 10% organic matter.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in green houses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants, **Do not** apply when extreme cold (< 35 °F) is expected.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate. May be shallowly cultivated (1-2 inches). **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. **Do not** apply to ornamental plantings where the likelihood of runoff onto lawn areas containing cool-season turfgrass species exists as severe injury or death may occur. Over-application may result in crop injury or excessive soil residue.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grass weeds.	**Consult label for listing of tolerant species.** Apply any time during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate physically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Very slight leaf speckling has been observed on a few species with no reduction in vigor or growth.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
simazine + metolachlor	0.05-0.07 oz + 0.07-0.11 oz Princep 4L + Pennant 7.8E or 1.4-2.8 oz Derby 5G	0.8-1 + 2-3	10 days after transplant.	Annual grasses and broadleaf weeds.	**Liriope only.** Apply before weeds emerge or after existing weeds are removed. Use high rates on fine-textured soils and low rate on coarse-textured soils where light infestations of broadleaf weeds are expected. Prolonged wet soil conditions after the herbicide is applied will reduce the length of weed control.
trifluralin	0.18 lb Treflan 5G	4.0	After plants become established.	Annual grasses and some broadleaf weeds.	**Consult label for list of tolerant crops**. Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
ORNAMENTAL GRASSES					
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until after soil around plant roots has settled.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.
metolachlor	2 tbsp Dual Magnum 7.8E/gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	See label for complete listing of tolerant species. Direct spray towards the base of established ornamentals transplanted a minimum of 10 days.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
WOODY ORNAMENTAL PLANTS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species**. **Do not** apply peat moss before treating with Betasan. For landscape and field use.
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches.
dichlobenil	0.23 to 1.14 lb Casoron 4G	4 to 20	4 weeks after transplanting in early spring and fall.	Annual and perennial weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply only to a well prepared weed-free soil before seeds of annual weeds germinate or after cultivation to remove all growing weeds. **Do not** apply until 4 weeks after transplanting. **Do not** use in seed beds, transplant or cutting beds, or in greenhouses. **Do not** use on extremely sandy soils. Shallow incorporation or sprinkler irrigation immediately after application is recommended. This product is effective only during cool seasons in Mississippi (air temperature < 70 °F).
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3- to 5-inches high or 2 weeks ater transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Must be incorporated thoroughly in top 2 inches of soil growth if plant is 3-5 inches tall or 2 weeks after transplant. Beds must be clean at time of treatment.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species**. Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
imazaquin	0.45 to 0.6 tsp Image	0.5	Apply to established ornamentals.	Broadleaf weeds, wild garlic, onion, and sedges.	**Consult label for listing of tolerant species.** Add 0.25% nonionic surfactant to spray mix**. Do not** apply to container-grown plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species**. **Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days. For field and container use. Some liners are also registered.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses. **Do not** apply to nursery seedbeds or transplant beds, unrooted liners or cuttings planted in pots for the first time, pots less than 4 inches wide, or newly transplanted ornamentals. **Do not** apply over 600 lb per acre per year.
metolachlor	2 tbsp Dual Magnum 7.8E /gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. For field use only.

Ornamental Crops, Continued

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
metolachlor + simazine	0.09-0.18 lb Derby 5G	2-4	Apply prior to weed emergence.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until soil has settled around plant roots. If applied to wet foliage, apply overhead irrigation to remove herbicide granules.
napropamide	2.88-1.48 oz Devrinol 5G	4-6	After transplanting.	Grassy weeds.	**Consult list of plant species on which Devrinol 5-G Ornamental can be used.** Apply Devrinol 5-G Ornamental as a broadcast application over containers only. Normal irrigation or rainfall should provide sufficient water for satisfactory control. Do not use on soils containing more than 10% organic matter. For landscape, field, or container use according to species.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. Do not use on soils containing more than 3% organic matter. Landscape use only.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. For field and container use. Registered on selected liners.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for complete listing of tolerant species.** Apply anytime during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate phsically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxadiazon + prodiamine	0.45 lb of RegalStar G	1 lb + 0.2 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant species.** No more than two applications per year are recommended.
oxyfluorfen	0.18-0.37 oz Goal 2E	1-2	Preemergence or postemergence.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Use 0.25% nonionic surfactant if weeds are present.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants. For container and field use.
oxyfluorfen + oxadiazon	0.22 lb Regal O-O	2 + 1 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant crops.** Excellent activity for bittercress.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.
pronamide	0.07-0.15 oz Kerb 50W	1-2	Late fall prior to weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Apply to established plantings only.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been seen on a few species with no reduction in vigor or growth.
simazine	0.9-3.8 oz Princep 4G	25-100	Apply early spring after first year of establishment.	Most annual broadleaf weeds and some annual grasses.	**Consult label for list of tolerant crops.** For use on conifers only.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
CHRISTMAS TREES				
Preplanting				
trifluralin 0.5 to 1.0 lb	Treflan 4E — 1 to 2 pt	Preplant incorporated and post plant.	Most annual grasses and a few small-seeded broadleafs.	For Scotch, loblolly, white pine, and red cedar. Apply to weed-free soil and incorporate immediately. Applications may be made to establish plantings by setting incorporating tools to throw treated soil around the plants.
Preemergence				
hexazinone 1.0 to 1.7 lb	Velpar L — 4-7 pt per acre.	Do not use in 2- to 5- year-old plantations.	Pre- and post-emergence control of many annual grasses.	See label for tree varieties cleared. Velpar L can be applied over the top or as a direct spray. **Do no**t add surfactant if applied over the top of trees. Use directed sprays if applied after bud break and add 1 quart surfactant per 100 gal spray to improve postemergence activity. If multiple applications are used for postemergence control, use 2 to 4 pints each application.
metolachlor 2.0 to 3.9 lb/A	Pennant Liquid Herbicide — 7.8 lb/gal 2 to 4 qt/A	Before weeds emerge.	Annual grasses and yellow nutsedge.	Apply in 10 or more gallons water prior to emergence of weeds but after soil has settled around the transplant. Cultivate or control emerged weeds with postemergence herbicides. A second application may be needed to provide control for an extended period. Use 2 pints for coarse textured, low organic matter soils and the 4-pint rate for high organic clay soils or where yellow nutsedge is a problem.
napropamide 4.0 to 6.0 lb/A	Devrinol 50WP — 8 to 12 lb	Postplant, established, before weed germination.	Most annual grasses and a few small-seeded broadleafs.	Apply over the top of newly planted or as a directed spray to establish plantings. Apply any time of year but make application to weed-free soil. Rainfall, irrigation, or mechanical incorporation 1 to 2 inches deep ensures control. Often provides season-long control of annual grasses and many small-seeded broadleaf weeds.
oryzalin 2 to 4 lb	Surflan 4 lb/gal WP — 4 to 6 pt in 20 to 40 gal water	Late winter or early spring before weeds germinate.	Annual grasses and a few small-seeded broadleafs.	For short-season control apply lower rates. Increase rates for longer control. May be applied over the top of trees. Use after trees are planted and soil is settled. If low rates are used, one additional treatment in the late spring or early summer will likely be needed.
oxyfluorfen 1.0 to 2.0 lb/A	Goal 2XL 1.6E — 4.0 to 8 pt	Postplant.	Pre and postemergence control of small annual grasses and broadleafs.	For many conifer species. Apply after transplanting while trees are still dormant. Add 0.25% surfactant if weeds have emerged. Generally 5 pt/acre rate provides acceptable control, but heavy weed pressure (many small weeds or larger weeds) may require the higher rates. Ground application only.
pendimethalin 2 to 4 lb/A	Stomp — 4 lb/gal 2 to 4 qt/A	Before weed seeds germinate.	Certain annual grasses and broadleafs.	Apply in 20 gallons water to established plantings. May be applied over the top of trees. It will not control emerged weeds. Rainfall or irrigation must be applied to initiate control. Use the low rate for short-term control and the high rate for long-term control.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
simazine 2.0 to 4.0 lb/A	4L - 2 to 4 qt Princep 5G — 50 to 100 lb	Spring or fall before weed germination.	Annual grasses and broadleafs.	For red cedar and white pine. Remove weed growth before applying or kill using postemergence herbicide. Trees must be 3 years old.
Postemergence				
clethodim	Prism — 17 to 34 oz in 5 to 40 gal of spray solu tion. Use 0.25% v/v nonionic surfactant.	When grass is 1-18 in. high (follow table on label).	Most grasses.	**Do not** apply directly to water or to areas where runoff is likely to occur.
fluazifop-butyl 0.1-0.2 a.i. lb/A	Fusilade DX — 8 to 16 oz in 10-40 gal water. Add 1 qt nonionic surfactant or 4 qt crop oil concentrate per 100 gal spray.	When grass is between 1-6 inches tall.	Most grasses.	**Do not** tank mix Fusilade with other herbicides. Check label for labelled species.
glyphosate 0.75 to 3.7 lb ae	glyphosate — 1.0 to 5.0 qt 3 lb ae/gal formulation in 10 to 40 gal water.	Anytime weeds are actively growing.	Most vegetation covered.	Apply to undesirable vegetation in 20 to 40 gallons water. Use low rate for small annual weeds and high rate for perennials. For annual weeds less than 6 in tall in small areas mix 1 to 2 fl oz per gallon or for annual weeds mor than 6 in tall or perennial weeds, mix 2 to 3 fl oz per gallon and spray lightly to cover. Delay plantings and cultivations for at least 5 days for best weed control. When spraying adjacent to small desirable plants, use a shield to prevent spray from from contacting the green part of plants. Repeat as needed to maintain control.
hexazinone 0.90 to 1.8	See preemergence section.			
paraquat 0.5 to 1.0	1.33 to 2.5 pt of 1.5 lb/gal formulation	When weeds are 1 to 6 inches tall.	Most annuals; top kill of perennials.	Add 1 quart of nonionic surfactant to each 100 gallons spray. Apply as directed spray to prevent contact of spray with green stems or foliage. Keep pressure low. **Do not** spray when windy.
sulfometuron-methyl	See preemergence section.			

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
PERIPHERAL AND NONCROP AREAS					
glyphosate	1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water 2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water	1-3	While weeds are actively growing.	Most annual and perennial weeds less than 6 in tall. Annual weeds over 6 in tall and perennial weeds.	**Avoid contact with desirable vegetation. Do not** spray green bark or foliage of any desirable vegetation. For optimal controlof perennial weeds apply during seed production or 2 to 4 weeks before frost.
paraquat	0.07 - 0.11 oz Gramoxone Max 2.5EC	0.56-0.94	Anytime to foliage of weeds only.	All vegetation contacted.	Apply for full coverage of weeds. Best results are obtained when weeds are young and succulent. Repeat application as needed. The addition of nonionic surfactant (0.5-1 pint per 100 gallons spray solution) is recommended. **Use in NONCROP AREAS**. Prevent contact with desirable vegetation. **Use protective clothing when applying paraquat.**
gluphosanate-ammonium	0.15-0.4 oz of Finale® (11.3%), depending on weed and stage of growth (see label)	0.21-0.37	While weeds are actively growing.	Most annual and perennial weeds.	Avoid contact with desirable vegetation. Spray to wet foliage. **Do not enter or allow entry of maintenance workers into treated areas during the restricted-entry interval (rei) of 12 hours. Wear personal protective equipment (ppe) indicated on label.**
diquat	4 tsp Reward® plus 1 tsp 75% nonionic surfactant per gallon	1.0	Apply to young weeds since control decreases as weeds mature.	Most above-ground grasses and broadleaf weeds.	Apply for full coverage and thorough weed contact. Retreatment may be necessary to control grasses and established weeds. Avoid spray contact with foliage of food crops or ornamental plants. **Do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew or rain, without appropriate protective clothing until spray has dried.**

FRUIT AND NUT CROPS

SUGGESTED USES OF HERBICIDES ON FRUIT AND NUT CROPS

Herbicide	Apple	Blackberry	Blueberry	Grape	Peach	Pecan	Strawberry
2,4-D	Yes[1]	No	No	No	No	No	Yes[2]
Bentazon[3]	Yes	Yes	Yes	Yes	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clethodim	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes
DCPA	No	No	No	No	No	No	Yes
Dichlobenil	Yes[4]	Yes[2]	Yes[4]	Yes[4]	No	Yes[4]	No
Diquat[3]	Yes	Yes	Yes	Yes	Yes	Yes	No
Diuron	Yes[1]	No	Yes[1]	Yes[5]	Yes[5]	Yes[5]	No
Fluazifop[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flumioxazin	Yes[6]	No	Yes[6]	Yes[6]	Yes[6]	Yes	Yes
Fluroxypyr	Yes[7]	No	No	No	No	No	No
Glufosinate	Yes	No	Yes	Yes	No	Yes	No
Glyphosate	Yes	Yes	Yes	Yes	Yes[8]	Yes	No
Halosulfuron	Yes[1]	No	Yes[1]	No	No	Yes[1]	No
Hexazinone	No	No	Yes[5]	No	No	No	No
Isoxaben[9]	Yes	Yes	Yes	Yes	Yes	Yes	No
Mesotrione	No	No	Yes	No	No	No	No
Metolachlor	Yes	No	No	No	No	No	No
Napropamide	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Norflurazon	Yes	Yes[1]	Yes[10]	Yes[8]	Yes[10]	Yes[10]	No
Oryzalin	Yes	Yes	Yes	Yes	Yes	Yes	No
Oxyfluorfen	Yes	No	No	Yes[5]	Yes	Yes	No
Paraquat	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pronamide	Yes	No	Yes	Yes	Yes	No	No
Rimsulfuron[1]	Yes	No	No	Yes	Yes	Yes	No
Sethoxydim	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Simazine	Yes	Yes	Yes	Yes	Yes[5]	Yes[8]	No
Terbacil	Yes	Yes[1]	Yes[1]	No	No	No	Yes

[1]Apply to orchards at least 1 year old.

[2]Apply to established plantings only.

[3]Do not apply to crops that will bear harvestable fruit within 12 months.

[4]Do not apply earlier than 4 weeks after transplanting.

[5]Apply to plants established 3 years or more.

[6]Do not apply less than 2 months before transplanting.

[7]Do not apply to trees less than 4 years old.

[8]Apply to plants established at least 2 years.

[9]Apply to nonbearing crops only.

[10]Apply to plants at least 6 months old.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
benefin + oryzalin XL 2G	2.5 lb ai 150 lb 2G	Nonbearing Apple Blackberry Blueberry Grape Peach Pecan	Before weeds germinate.	Many annual grasses and small seeded broadleaf weeds.	Rainfall or irrigation critical for acceptable weed control. Emerged weeds must be controlled before application. Do not apply within 1 year of harvest. Do not re-enter treated sites within 12 hours after application.
bentazon Basagran 4SL	0.75-1.0 lb ai 1.5 to 2.0 pt	Nonbearing Apple Blackberry (at or before planting only) Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray when weeds are actively growing. Keep spray off green foliage and stems.	Many broadleaf weeds, including coffee senna, dayflower, smartweed, prickly sida, sesbania, wild mustard, wild poinsettia, and yellow nutsedge.	Do not apply within 1 year of harvest. Adding crop oil concentrate at 1 qt/A improves control of certain weeds. Do not apply to stressed plants or injury may occur. Do not exceed 2 pt/A per application or total application of 4 pt/A per year. Do not graze animals in treated fields or use hay from treated fields for animal feed or bedding.
carfentrazone-ethyl Aim EC	1–2 oz/A	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most broadleaf weeds.	Use a minimum of 20 gallons of spray per broadcast acre. A nonionic surfactant or crop oil concentrate is required. Apply as a directed spray.
clethodim 2 lb/gal	0.09-0.13 lb ai 6-8 oz	Strawberry Nonbearing Apple Blackberry Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Annual and perennial grasses.	Sequential applications to strawberry should not be made less than 14 days apart. Do not apply within 4 days of strawberry harvest. Do not apply to other fruit or nut crops within 1 year of harvest. Do not exceed 8 ounces per acre per application or 32 ounces per acre per year. Do not apply if rainfall is expected within 1 hour after treatment.
DCPA Dacthal 75% WP	8-10.5 lb ai 10.7-14.0 lb	Strawberry	Before weed emergence.	Annual grasses and some small-seeded broadleaf weeds.	Apply no more than 9 lb a.i/A for establishment plantings nor 10.5 lb a.i/A to established plantings. **Do not** apply after first bloom. Rainfall or irrigation following applications improves weed control.
dichlobenil 4% G 50% WP	4.0-6.0 lb ai 100-150 lb 8.0-12 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergence in late winter to early spring after plants established at least 4 weeks.	Many annual and perennial grasses and broadleafs.	Apply as directed spray be fore weed seed germinate. Use low rate for annuals if application is followed by more than 0.5-inch of water. Use high rate for perennials or if incorporation is poor.
diquat Reglone	0.25-0.5 lb ai 1.5-2.0 qt	Nonbearing Apple Blackberry Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Small broadleaf and grassy weeds.	Do not apply within 1 year of harvest. Do not allow spray to contact green foliage, stems, or fruit. Do not graze treated sites.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
diuron 80% DF/WP 4 lb/gal diuron 80% DF/WP 4 lb/gal	1.2-3.0 lb ai 1.5-3.7 lb 2.4-6.0 pt 1.2-1.6 lb ai 1.5-2.0 lb 2.4-3.2 lb	Apple Blueberry Grape Peach Pecan	Preemergent in spring or early summer. Add 0.5% surfactant if weeds have emerged.	Annual grasses and broadleafs.	Apples must be established at least 1 year and peaches and pecans must be established at least 3 years. **Do no**t apply on soils containing less than 1% organic matter. **Do not** use on sand, loamy sand, or gravelly soils.
2,4-D Formula 40 3.8 lb/gal	0.5-1.0 lb ai 1.0-2.1 pt	Apple Strawberry	After last picking.	Most broadleaf weeds.	Use in established plantings after last picking. **Do not** apply unless possible injury to crop is acceptable. **Do not** apply to bare ground.
fluazifop Fusilade DX	0.25-0.37 lb ai 8-16 oz	Nonbearing: Apple Blackberry Blueberry Grape Peach Pecan Strawberry	Warm weather when grasses are actively growing.	Grasses.	Apply to cover young actively growing annual and perennial grasses at least one hour before rain. **Do not** mix with other pesticides or apply to grasses injured by previous herbicide applications. Apply using 2 pt crop oil concentrate or 1/2 pint surfactant in 25 gallons spray.
flumioxazin Chateau 51 WDG	0.09-0.38 lb ai 3-12 oz	Apple Blueberry (highbush) Grape Pecan Strawberry	Before weeds emerge. Mix with other herbicides if weeds are present.	Annual grasses and broadleaf weeds.	Prevent spray contact with trees established less than 1 year or blueberries established less than 2 years. Do not apply to newly planted crops before soil has settled. Do not allow spray to contact strawberry foliage, and do not apply after fruit set. Apply after final harvest up to bud break to crops other than strawberry. Do not apply within 60 days of harvest for apple, grape, peach, and pecan; do not apply within or 21 days for strawberry. Annual treatments should not exceed 3 ounces per acre for strawberry, 12 ounces per acre for blueberry, or 24 ounces per acre for other crops.
fluroxypyr Starane Ultra	0.35-0.7 0.7-1.4 pt	Apple	While weeds are small and actively growing.	Broadleaf weeds.	Do not apply during bloom or within 14 days of harvest. Do not apply more than once per year; applications should not exceed 1.4 pints per acre annually. Do not use on trees less than 4 years old.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
glufosinate ammonium Rely 200	0.75-1.25 lb ai 57–96 oz/A	Apple Grape Blueberry Pecan	Apply low rate if weeds are less than 6 in. tall or high rate if weeds are 6 in. or more tall. Apply 2.4 fl oz/gal for spot treatment.	Broadleaf, grasses, and sedges.	Avoid contact with foliage or green tissue of desirable vegetation. Do not harvest within 14 days after application. Do not apply to apples planted less than 1 year. Do not exceed 12 qt/A/year in berries.
glyphosate	0.75 - 2.25 lb ae 1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water or 1 gal 3 lb ae/100 gal water	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most annual weeds less than 6 in tall.	Apply as a directed spray, avoiding contact with foliage, green stems or open wounds of crop. In peach orchards, apply to trees at least 2 years old with shielded sprayer that prevents contact with any part of trees. Do not apply within 90 days after first bloom. For optimal control of perennial weeds, apply during seed production or 2 to 4 weeks before frost.
	2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water or 2 gal 3 lb ae/100 gal water			Most annual weeds over 6 in tall and perennial weeds.	
halosulfuron Sandea 75WDG	0.032-0.063 0.66-1.33 oz	Apple Blueberry Pecan	While weeds are actively growing.	Sedges and some broadleaf weeds.	Do not apply to trees established less than 1 year. Do not exceed 2 ounces per acre per year or allow spray solution to contact trunk, stem, or foliage. Allow 45 days between sequential applications to blueberry. Add 0.25% by volume nonionic surfactant.
hexazinone Velpar L	1-2 4-8 pt	Blueberry (highbush)	In spring before lower leaves expand.	Grasses and broadleaf weeds.	Do not apply to plants established less than 3 years. Avoid drift onto foliage to minimize injury. Do not apply to flooded fields. Do not apply within 90 days of harvest.
isoxaben Gallery 75 DF	0.5-1.0 lb ai 0.6-1.3 lb	Nonbearing: Apple Blackberry Blueberry Grape Peach Pecan	Preemergence in late fall or early summer.	Broadleaf weeds.	**Do not** apply before soil around plant roots has firmed. **Do not** apply to plants that will bear harvestable fruit within 12 months.
mesotrione Callisto	Up to 6 oz/A	Blueberries	Preemergent prebloom.	Most broadleaf weeds.	Two 3-oz/A applications may be used, but make no more than two applications per year. Using a crop oil is recommended. Do not apply after the onset of bloom. Apply as a directed spray

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
metolachlor 8 lb/gal	2.0-4.0 lb ai 2.0-4.0 pt 2.0-4.0 pt	Apple	Preemergence in spring prior to weed emergence.	Annual grasses, small-seeded broadleafs, and yellow nutsedge.	**Do not** apply to orchards less than 30 days old or before soil settles around transplants and are filled in. If weeds have emerged, control by tillage or post-emergence herbicides. **Do not** harvest grapes within 12 months of application.
napropamide Devrinol 50% WP	2.0-4.0 lb ai 4.0-8.0 lb	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	Preemergent before weed emergence.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation within 24 hours of application is necessary for weed control. Application may be made immediately after planting and once each year following. Application to strawberry should be delayed until the desired number of daughter plants are established. **Do not** apply from bloom to harvest.
norflurazon Solicam Zorial 80% DF	2.0-4.0 lb ai 2.5-5.0 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge. Use when plants are dormant, before weeds emerge.	Annuals.	Avoid contact with leaves and fruit. Use lower rates on lighter soils and higher rates on heavier soils. One application per year. See label for tank mixes.
oryzalin Surflan AS 4 lb/gal	2.0-4.0 lb ai 4.0-6.0 pt	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation follow ing applications improves weed control. Existing weeds should be destroyed before application. Use lower rates for short-term control and higher rates for long-term control. May be tank mixed with diuron or simazine. See label for specific crop and rate recommendations.
oxyfluorfen Goal 2XL	0.5-2.0 lb ai 2.0-8.0 pt	Dormant Apple Grape Peach Pecan	Preemergence or postemergence. Add 0.25% nonionic surfactant if weeds are emerged.	Annual grasses and broadleaf weeds.	**Do not** apply after bud swell or if foliage, fruit, or nuts are present.
paraquat Gramoxone Extra 2.5 lb/gal	0.62 to 0.93 lb ai 2.0-3.0 pt Add up to 1 qt of a suitable nonionic surfactant to 100 gal of spray solution.	Apple Blackberry (Brambles) Blueberry Grape Peach Pecan	When weeds are actively growing before 6 inches tall.	Annuals and top kill of perennial weeds.	Avoid contact with crop plant. **Do not** graze treated area. **Do not** apply when nuts to be harvested are on ground. **Must be used by certified applicator.** May be tank mixed with simazine. See label for specific crops and rates. Brambles and blackberries: apply before emergence of new shoots as injury may occur.

Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
pronamide Kerb 50 W	1.0-4.0 lb ai 2.0-8.0 lb	Apple Blueberry Grape Peach	Preemergence or postemergence. Late fall or early winter.	Annual and perennial grasses and broadleaf weeds.	**Do no**t apply more than 4 lb Kerb/season to blueberries. Apply to established blueberries only.
rimsulfuron Matrix FNV 25 WG	0.063 4 oz	Apple Grape Peach Pecan	While weeds are actively growing.	Broadleaf weeds	Do not apply to trees established less than 1 year or exceed 4 ounces per acre per year. Allow 7 days between application and harvest for apple. Allow 14 days between application and harvest for other crops. Add 0.25% by volume nonionic surfactant.
sethoxydim Poast 1.5E	0.3-0.5 lb ai 1.5-2.5 pt	Bearing: Apple Blueberry Grape Strawberry Nonbearing: Peach Pecan	Postemergence when grasses are actively growing.	Annual and perennial grasses.	Rate dependent upon grass species, size, and growing conditions. Always add 2 pt Crop Oil Concentrate to each 100 gal spray. Do not apply to nonbearing crops within one year of harvest. **Preharvest intervals:** Apple 14 days Blueberry 30 days Grape 50 days Strawberry 30 days
simazine Princep 4 lb/gal 90%DG	2.0-4.0 lb ai 4.0-8.0 pt 2.2-4.4 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before bud break of crop.	Annuals and perennials.	One year establishment before application in apple, blackberry, blueberry, and peach, 2-year establishment before application in pecan and 3-year establishment before application in grape. May be used in combination with paraquat. See label for instructions on specific crops and rates.
terbacil Sinbar 80% WP	0.1-1.25 0.125-1.0 lb	Apple Blackberry Blueberry Peach Pecan Strawberry	Preemergent in spring or fall.	Annuals.	Treat only when bushes have been established for at least one year. Consult label for correct application technique.
triflurali + isoxaben Snapshot 2.5TG	2.5-5.0 lb ai 100-200 lb	Nonbearing Apple Blackberry Blueberry Grape Peach Pecan	Preemergent prior to weed germination or immediately after cultivation.	Many broadleaf summer and winter annual weeds.	Do not apply within 1 year of harvest. Do not apply to newly transplanted crops until soil has settled and no visible soil cracks exist. Do not exceed 600 lb/A per year. Sequential applications of 150 lb/A or more should not be made within 60 days of previous applications.

WOODY PLANTS

General recommendations for applying herbicides to forest trees, brush, and woody vines.

CUT-SURFACE TREATMENTS: FOREST TREES

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Trees 1 inch in diameter and larger.	Any season, but growing season treatments are most effective. Avoid sap rise and leaf expansion in spring if possible.	(1) 2,4-D (amine) — 4 lb/gal.	Apply 1 ml solution in each cut; space cuts 2 inches apart, edge to edge about waist high.
			(2) triclopyr (Garlon 3A) diluted 1 part Garlon 3A: 1 part water.	
			(3) picloram + 2,4-D (Pathway).	Use on all species any time of year. Overlap injector cuts on hard-to-kill species, such as hickory, dogwood, blue beech, and ash. Do not allow picloram to spill into the root zone of desirable and very susceptible species such as yellow poplar and pine.
			(4) imazapyr (Arsenal Applicators Concentrate) dilute solution: mix 4-6 oz Arsenal AC per gallon of water.	Make cuts through the bark completely around the tree with not more than 2 inches between cut edges. Spray or brush Chopper solution into the cuts until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) concentrated solution: mix 25 oz Arsenal AC with no more than 103 oz water.	Make one cut for every 3 inches diameter breast height. Spray 1 ml into each cut. Best results obtained from September - March.
			(6) glyphosate (Accord SP) diluted 1 part Accord SP: 2 parts water.	Apply 1 ml of solution for every 2 inches trunk diameter.
Stump	Sprout control on cut hardwood stumps, particularly on species that sprout profusely: oaks, maple, beech, hickories.	Any season, but most effective as soon as possible after cutting; if possible, treat the same day of cutting.	(1) 2,4-D (amine) — 20 lb/100 gal.	Apply with low volume knapsack sprayer using solid-cone nozzle of medium orifice.
			(2) picloram + 2,4-D (Pathway).	
			(3) triclopyr — 20-25% Garlon 4, + 10% surfactant, + 65-70% diesel fuel.	Triclopyr in diesel fuel can be applied to stumps as late as 3 months after cutting.
			(4) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Spray or brush the Chopper solution onto the cambium area (just inside the bark) of freshly cut stumps until thoroughly wet.
			(5) imazapyr (Arsenal Applicators Concentrate) — mix 4-6 oz Arsenal AC per gallon of water.	Spray or brush the Arsenal solution onto the cambium area (just inside the bark). Ensure that the solution thoroughly wets the entire cambium.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
BARK, FOLIAGE, AND SOIL TREATMENTS: BRUSH AND FOREST TREES				
Basal Bark	Scattered brush or "clumps" of hardwood brush and small trees. Can be used on species remaining after foliar spray. Expect poor control on root-suckering species: black locust, hickories, and sassafras. Best results on trees less than 3 inches diameter.	Any season (Avoid leaf expansion).	(1) 2,4-D + 2,4-DP (LV esters) — 8 to 12 lb each per 100 gal oil.	Drench lower 12 to 15 inches of plant. Density of brush will determine rate per acre.
			(2) triclopyr — 1.5 gal Garlon 4 + 98.50 gal diesel fuel.	Spray the lower 1.5 to 2 feet of brush to runoff, ensuring coverage of root crown.
			(3) 2 gal Garlon 4 + 25 gal diesel + 0.5 gal surfactant + 72.5 gal water.	Follow label directions for mixing. Apply as above.
			(4) triclopyr + picloram — 1-2 gal Access in oil to make 100-gal mix.	Works best on basal diameters up to 6 inches. Drench lower 1.5 to 2 feet of stem.
		Late summer, fall, and winter. Reduced control may occur during sap rise or leaf expansion in spring.	(1) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil.	Apply to wet the lower 12-18 inches of hardwood stems less than 4 inches in diameter at breast height. Ensure that the roots of desirable hardwoods do not extend into the treated area.
Stream-Line thinline	Same as above except best on trees less than 3 inches diameter with juvenile bark	Best results obtained in March-June.	(1) triclopyr 20-25% Garlon 4 + 10% v/v surfactant + 60-75% diesel fuel.	With a backpack sprayer and a straight stream nozzle, a 2- to 3-inch-wide band of herbicide is sprayed on each stem. Treat the stem from two sides if it is 1- to 3-inch diameter to ensure that the herbicide completely encircles the stem.
Selective Hardwood Control in Pine Plantations	Hardwood sprouts and large trees in young (1- to 6-year-old) pine stands	July through early October.	(1) imazapyr (Arsenal Applicators Concentrate) apply 16-32 oz Arsenal AC per acre in 10-15 gal water. Add 0.25% v/v nonionic surfactant.	Apply as a broadcast spray to release loblolly and Virginia pine. Use 12-16 oz Arsenal AC to release slash pine or shortleaf pine stands at the end of the third growing season or thereafter.
			(2) imazapyr (8-9 oz Arsenal AC) + metsulfuron (1-1.5 oz Escort XP) per acre.	Apply broadcast in 10-15 gallons of spray per acre.
			(3) imazapyr (Arsenal Applicators Concentrate) mix 1 oz Arsenal AC per gallon of water. Add 0.5% v/v minimum nonionic surfactant.	Apply to individual hardwood crowns. Spray to obtain good coverage of the entire crown, but not to the point of runoff. Effective in controlling hardwood sprouts less than 7 feet in height for forest site preparation and pine release. Use as a directed spray to release any conifer species.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliage Spray (low volume, aerial, non-selective)	Large tracts of mixed brush and hardwoods on utility rights-of-way and for range and pasture establishment. All unwanted small trees and shrubs for site preparation in advance of seeding or planting forest trees.	During growing season from late spring to early summer. Effectiveness is decreased during periods of drought.	(1) 8-12 lb 2,4-DP (LV esters) per 30 gal water per acre.	Use aerial application, low-volume sprayer. Use drift control agent in mixture. See Weedone 2,4-DP label for specific instructions.
			(2) 2 lb each of 2,4-D and 2,4-DP (LV esters) and 1.66 lb MSMA per 10 gal water.	Apply 10 gallons of spray per acre before planting to reduce competition from mixed hardwoods and brush.
			(3) triclopyr + picloram + 2,4-D — 0.5 gal Garlon 4 + 1.5 gal Tordon 101 mixture.	Apply 10-15 gallons of spray per acre.
			(4) 0.5 gal Garlon 4 + 0.5 gal Tordon K.	Apply 10-15 gallons of spray per acre.
			(5) hexazinone 1-3 gal Velpar L per acre. Rate depends on soil texture.	For exact rate of Velpar L, consult label. Rate dependent on soil texture.
		Midsummer to fall.	(1) glyphosate — 6-8 qt Accord SP in 10 gal water. Addition of nonionic surfactant at 2.5% v/v is recommended.	
			(2) imazapyr — 48-64 oz of Chopper EC per acre. Addition of nonionic surfactant at 0.5-1% v/v is recommended.	Best results are obtained from late summer or early fall applications; however, Chopper AC can be applied year-round.
		Late summer to early fall.	(1) imazapyr (Chopper EC) — apply 48-64 oz per acre in 10-15 gal water. Add 0.5-1% v/v nonionic surfactant.	
			(2) imazapyr + glyphosate — 32-48 oz Chopper EC + 4-5 qt. Add 0.5-1% v/v nonionic surfactant.	
			(3) imazapyr + triclopyr — 32-48 oz Chopper EC + 32-40 oz Garlon 4. Add 0.5-1% v/v nonionic surfactant.	
			(4) imazapyr + metsulfuron methyl 40-48 oz Chopper EC + 1-2 oz Escort XP. Add 0.5-1% v/v nonionic surfactant.	
		During growing season from leaf out to fall colors.	(1) glyphosate + imazapyr — 1-5 qt Accord SP + 32-64 oz Chopper EC or 1-3 qt Accord SP + 40-64 oz Chopper EC per acre in 10-15 gal of water. Add 0.5% v/v nonionic surfactant.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
			(2) glyphosate + triclopyr — 3-6 qt Accord SP + 1-2 qt Garlon 4 + 2.5% v/v nonionic surfactant.	Apply 10-15 gallons solution per acre.
			(3) fosamine + imazapyr — 4.6 qt Krenite UT + 16-20 oz Chopper + 1.5% v/v nonionic surfactant in 10-15 gal of water.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
	Heavy hardwood competition and residual pine.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1 qt Garlon 4 + 16-24 oz Chopper EC.	Use nonionic surfactant at 0.5% v/v.
			(2) 4-8 qt Krenite UT + 16-24 oz Chopper EC + 1% v/v nonionic surfactant.	
			(3) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant.	Spray to wet.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
	Light hardwood competition and residual pine and grasses.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal.	Use nonionic surfactant at 0.5% v/v.
			(2) 8 qt Tordon 101M + 8-10 oz Arsenal.	
		June 1 to leaf drop.	(3) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use higher rates for Virginia and Shortleaf pine. Spray to wet.
	Hardwood, pine, and grass.	Aug. 1 to fall color.	(1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal.	Use nonionic surfactant at 0.5% v/v.
		June 1 to leaf drop.	(2) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant.	Use higher rates for Virginia and Shortleaf pine. Spray to wet.
Foliage Spray (high volume, ground)	Scattered brush or "clumps" of hardwood brush. Can be used on species not controlled by prior sprays, such as maple, oak, ash, and persimmon growing along fence rows, highways, rights-of-way, and other non-crop areas.	Late spring and summer from time foliage is fully developed. Dormant season ineffective.	(1) 2-3 lb each of 2,4-D and 2,4-DP (LV esters) per 100 gal water.	Apply uniformly over top of brush as a coarse spray. With back-pack sprayer, wet all foliage to point of runoff. With hydraulic sprayer, apply 200 to 600 gallons of spray mixture per acre, depending on height and density of brush.
			(2) 1-3 qt Garlon 4 per 100 gal water.	Apply 100-400 gallons of spray per acre depending on size and density of woody plants. Spray to wet.
		Growing season from leaf out to fall colors.	(1) glyphosate — 2-4 qt of Accord SP per 100 gal of water. Add 1-2 qt nonionic surfactant.	Apply 100-200 gallons of spray per acre. Spray to wet.
		Late spring to fall color	(1) 4-8 qt Krenite UT + 2 oz Escort XP per 100 gal water + 1% v/v nonionic surfactant.	Apply 100 gallons per acre. Spray to wet.
			(2) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant per 100 gal water.	Spray to wet.
Soil application with handgun applicator	Individual trees or scattered "clumps" of trees or brush. Can be used to treat large tracts with mixed brush and hardwoods.	Mid-March through May. Rain after application is required to activate the herbicide.	2-4 ml of 25% hexazinone (Velpar L) for each inch of stem diameter. For grid pattern to use in site preparation, refer to Velpar L label.	Apply undiluted with exact-delivery handgun applicator. Direct treatment to soil within 3 feet of root collar of trees to be controlled. For large trees requiring more than one delivery, make applications on opposite sides of the stem. Rate of herbicide when applied in a grid pattern will depend on soil texture. Refer to the Velpar L label for exact rates.
Soil application (dry materials)	Individual trees.	Early spring applications are most effective.	(1) 10% hexazinone (Pronone 10G) — 0.5-0.75 oz per inch diameter of tree.	Apply completely around base of tree. **Do not** apply in root zone of desirable plants. If root grafting occurs, some desirables may be killed outside the treatment area. Increase rates on fine-textured soils (clay, etc.). If slope is greater than 12-15%, damage down the slope from treatment area may occur.
	"Clumps" of brush of all species and sizes. Forestry site preparation and rights-of-way.	Apply before or during period of active growth of species to be controlled, when rainfall can be expected for soil activation.	(1) Pronone 10G — 5-30 lb/A. Soil texture determines rate.	Apply with aerial or ground equipment.
			(2) 75% hexazinone (Velpar ULW) — 2.5 to 5.5 lb/A depending on soil texture.	

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Selective herbaceous weed control in pine plantations	Grasses and broadleaf weeds, such as fescue, bahiagrass, goldenrod, dogfennel, broomsedge, etc.	Late winter to early spring before substantial growth occurs in spring.	(1) sulfometuron — 3-6 oz Oust per acre depending on weed complex.	Apply with ground or aerial sprayers delivering between 5-25 gallons per acre.
			(2) sulfometuron plus imazapyr — 2 oz Oust plus 4 oz Arsenal per spray acre.	Addition of Arsenal increases control of johnsongrass, bermudagrass, and other difficult species.
			(3) sulfometuron plus hexazinone — 2 oz Oust plus 2 to 3 pt Velpar L per acre.	Apply with ground or aerial sprayers at 5-25 gallons per acre
		Mid- to late spring after growth of weeds has begun.	sulfometuron plus glyphosate — 2-3 oz Oust plus 12-16 oz Accord SP per acre.	Apply in at least 10 gallons total solution. Addition of Roundup or Accord SP provides broad spectrum control of herbaceous weeds.
		Early spring to midsummer.	imazapyr (Arsenal AC) — Apply 4-10 oz per acre in 20-30 gal water. Add 0.25% v/v nonionic surfactant or less.	Best not to add surfactant for slash pine. Apply as a broadcast spray or as a 5- to 6-foot-wide band centered over pine rows. Labeled for loblolly, Virginia, and slash pine plantations.
		Late spring to midsummer.	1 oz Escort XP + 4-6 oz Arsenal in 10-30 gal water. Add .25% v/v nonionic surfactant or less.	Loblolly pine only.
DIFFICULT-TO-CONTROL WOODY PLANTS				
Foliar spray	Easter Red Cedar	Summer.	Tordon K — .25% solution in 1% diesel: water emulsion.	Spray to wet foliage.
			Tordon 101M — 32 oz + 4 oz nonionic surfactant in 5 gal water.	Spray to wet foliage.
Injection			Pathway — inject 3 to 4 ml for each 3 feet of tree height.	
Foliar spray	Osage Orange	March-June.	metsulfuron methyl (Escort XP) — 1 to 2 oz per 100 gal water with 0.5% nonionic surfactant.	Apply as high volume foliar spray. Treat to runoff.
Basal bark			triclopyr (Garlon 4) — Use 13 oz Garlon 4 + 13 oz Cide-Kick II surfactant + 100 oz diesel fuel.	Apply to smooth bark on stems no larger than 3 inches in diameter.
Foliar spray	Privet	May-Aug.	imazapyr (Arsenal AC) — Use a 1% v/v solution with 0.5% v/v nonionic surfactant in water.	Spray to wet foliage. May require retreatment if sprouting occurs.
		May-Sept.	metsulfuron methyl (Escort XP) — 4 oz/100 gal water + 1% v/v nonionic surfactant	Spray to wet. May require retreatment if sprouting occurs. Can be tank mixed with Arsenal.
		March - April	glyphosate (Accord SP) — 2 qt/A	Spray to wet. Provides excellent control (90 + %), but sprouting may occur.
Foliar spray	Yaupon	May-June.	6 qt Accord SP per acre + 2 qt Garlon 4 per acre	Spray to wet.
Foliar spray	Switchcane or Bamboo	May-Sept.	glyphosate (Roundup or Accord SP) — 4 qt/A + 1% volume to volume nonionic surfactant.	Best results are obtained after burning or cutting patches and applying spray to sprouts.
		Early spring	hexazinone — 8-10 qt/A — Velpar L	Sites should be dry at application time.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Chinese tallow	May-Feb.	triclopyr (Garlon 3A) Pathfinder II imazapyr (Arsenal AC)	Apply in dilutions and spacings specified on herbicide label. Nontarget plants may be killed or injured by root uptake of Arsenal.
Stumps	Chinese tallow	May-Feb.	triclopyr	Apply to stump tops immediately after cutting.
Basal Bark	Chinese tallow	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedling and Saplings	Chinese tallow	Jul.-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution Krenite S 2% v/v solution triclopyr Garlon 4	Spray to wet foliage (add 0.5% nonionic surfactant to all mixtures).
Soil surface	Chinese tallow	Growing season	Velpar L	Apply one squirt with a spot gun per 1 inch stem diameter within 3 feet of the stem or in a grid pattern at spacings specified on the herbicide label. For treatment of extensive infestations in forest situations. Nontarget plants may be killed or injured by root uptake.
Injection and Stumps	Mimosa (silktree)	May-Feb.	triclopyr Garlon 3A imazapyr (Arsenal AC)	Make stem injection using herbicide dilutions as specified on herbicide label. For felled trees, apply these herbicides to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.
Bark or Basal Bark	Mimosa (silktree)	Before bud break	20% v/v solution triclopyr (Garlon 4)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedlings and Resprouts	Mimosa (silktree)	Jul.-Oct.	2% v/v solution triclopyr Garlon 3A or Garlon 4 2% v/v solution glyphosate 0.2-0.4% v/v solution Transline	Spray to wet foliage (add 0.5% nonionic surfactant to Garlon 3A and Garlon 4 mixtures).
Injection and Stump	Tree-of-Heaven (Ailanthus)	Midsummer	triclopyr (Garlon 3A) Pathfinder II picloram + 2,4-D (Pathway) imazapyr (Arsenal AC)	Make stem injections in large trees then apply herbicide. For felled trees, apply herbicide to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Basal Bark	Tree-of-Heaven (Ailanthus)	Midsummer.	20% v/v solution triclopyr (Garlon 4)	Apply to young bark of saplings as basal spray in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor).
Foliage Spray	Tree-of-Heaven (Ailanthus)	July-Oct.	1% v/v solution imazapyr (Arsenal AC) 30% v/v solution (Krenite S) 2% v/v solution triclopyr (Garlon 4)	Spray to wet all foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Baccharis	Midsummer	triclopyr (Garlon 4)	Spray to wet foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Palmetto	spring	16 oz Garlon 4 + 4 g Escort XP	Spray to wet all foliage. Add 0.5% v/v non-ionic surfactant to spray solution. May require sequential applications for complete control.
WOODY VINES				
Foliage Spray and Soil Application	Poison Ivy	Late spring application most effective.	(1) picloram + 2,4-D — Use 2-3 gal Tordon 101 or Grazon P+D mixture in 15-50 gal water.	Broadcast over root zone. Use picloram only where desirable trees with root zone in the treatment area are expendable.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
		Mid-to late summer.	(1) 4-5 qt Accord SP or Roundup (glyphosate) per acre broadcast or 2% solution with hand sprayer.	Apply as foliar spray while leaves are green. Repeat applications may be necessary. Use the higher rate for plants that have reached woody stage of growth.
Foliar spray	Japanese Honeysuckle	Late spring and summer.	(1) 2,4-D (LV ester) — 4 lb/gal in 100 gal diesel.	Apply as a foliage spray thoroughly wetting all foliage and stems. Density will determine volume of spray per acre. Spot treat regrowth as required. Generally requires a followup or second application.
			(2) glyphosate — wet all foliage with a 2% Roundup or Accord SP solution.	
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
			(4) apply 1-2 oz Escort XP or Cimarron per acre in water solution.	Can damage black cherry or cottonwood.
Foliage spray and soil application	Wisteria	Aug.-Sept.	(1) picloram (Tordon K — 0.5 gal/A) (2) glyphosate (Accord SP — 8 qt/A) (3) dicamba (3% Banvel or Clarity) (4) metsulfuron (Escort XP or Cimarron — 1 oz/A) (5) clopyralid (Transline — 20 oz/A).	All treatments provided 90% brownout in first year — all to be reevaluated. (Add 0.5% nonionic surfactant to all mixtures.)

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Kudzu	Late spring to midsummer.	(1) picloram + 2,4-D — 1-2 gal Tordon 101 or Grazon P+D mixture in 20 gal water.	Apply as foliage spray after full leaf expansion; repeat when regrowth appears. Will damage pines and hardwoods.
			(2) dicamba + 2,4-D — 3 lb dicamba + 5.5 lb of 2,4-D in 20 gal water.	Note: Use for pine vs. hardwood.
			(3) Escort XP or Cimarron — 4 oz/A.	Can apply over/under pine. Apply after full leaf. Use with 1 quart of nonionic surfactant per 100 gallons of water. Will damage black cherry, cottonwood, winged elm, dogwood, and some other hardwoods.
			(4) Transline — 21 oz/A.	Can apply over or under pines. Can apply around hardwoods but may injure leguminous species.
Foliar spray	Multiflora Rose	Spring.	(1) dicamba — Mix 1 gal Clarity or Vanquish in 100 gal water.	Apply as a foliage spray after full leaf expansion; repeat when regrowth occurs.
			(2) 2,4-D (LV ester) — 4 lb in 100 gal water.	Addition of up to 5 gallons of diesel fuel per 100 gallons of spray will improve control.
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal of water.	Spray to wet foliage.
			(4) Escort XP or Cimarron — 0.75-1 oz per 100 gal water.	See Escort XP above.
		Summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 1% solution plus 0.5% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Trumpetcreeper	Late summer.	(1) Accord SP or glyphosate (3 lb ae/gal) — 4 qt/A + 0.25% nonionic surfactant.	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Redvine	Late summer.	(1) Vanquish or Clarity - 2 qt/A	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Grape Vine	Late spring to midsummer.	(1) 2,4-D (LV ester) — 4 lb in 100 gal water.	Spray all foliage until wet. Addition of crop oil will improve control.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.

DIFFICULT-TO-CONTROL HERBACEOUS PLANTS

Foliar spray	Blue Vervain	Late spring to early summer.	(1) Triclopyr 32 oz Garlon 4 or Remedy 48 oz Garlon 3A (2) Grazon P+D (3) Weedmaster	Add 0.25% v/v nonionic surfactant.

Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Cogongrass (A combination of herbicide treatment following burning or mowing may be more effective than herbicide treatment alone.)	Mid- to late summer.	(1) imazapyr — 48 oz/A or 1% solution of Arsenal or 24 oz/A or 0.5% solution of Arsenal AC with 1 qt nonionic surfactant per 100 gal spray.	Apply in 20 gallons of spray per acre.
			(2) glyphosate — 72 oz/A or 2% solution of 3 lb ae/gal formulation (with 0.5% v/v nonionic surfactant) if none in formulation.	Often requires treatment in consecutive years. Use 20 gallons of spray per acre. Apply mid-July to 2 weeks before killing frost.
			(3) imazapyr + glyphosate — 24 oz/A or 0.5% solution of Arsenal AC or 48 oz/A or 1% Arsenal plus 32 oz/A or 2% Accord SP or glyphosate (3 lb ae/gal) per acre with 0.25% v/v nonionic surfactant.	Apply in 20 gallons of spray per acre.
Foliar spray	Mistletoe	Winter.	Florel — 2 qt/A in 4 gal water + 0.25% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Johnsongrass	Summer.	(1) Fusilade DX at 8-12 oz/A or 0.5% solution + 0.25% nonionic surfactant or 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(2) Select at 6-8 oz/A or 0.25% solution + 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(3) Outrider at 1.33 oz/A with 1 qt nonionic surfactant per 100 gal spray.	
			(4) glyphosate (3 lb ae/gal) applied as 2% solution in fall. Add 1 qt nonionic surfactant per 100 gal if formulation has none.	
Foliar spray	Horsetail or scouring rush	Summer.	(1) Telar — 1.3 oz/A.	Repeat applications will be required. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray.
			(2) Oust — 6-12 oz/A.	
			(3) Rely — 3% solution.	
			(4) Casoron — 150-200 lb/A of Carson 4G.	
			(5) Hyvar XL — 6-12 gal/A.	
Foliar spray	Itchgrass	Summer-fall.	Glyphosate (Touchdown) 2% solution.	Spray itchgrass to wet all foliage. Be careful not to spray nontarget plants.
		Spring.	Hexazinone (Velpar) 0.5-0.53 lb/A.	Spray itchgrass to wet all seedling itchgrass foliage thoroughly. Add nonionic surfactant or oil concentrate.
		Summer-fall.	MSMA 4 lb/A.	Spray itchgrass to wet all foliage. If surfactant is not present in the formulation, add nonionic surfactant at 0.25%. If the objective is to encourage bermudagrass growth, use MSMA alone.
		Summer-fall.	Sethoxydim 1.5 % + 1% crop oil concentrate.	Spray itchgrass to wet all foliage but not to the point of runoff.

AQUATIC WEEDS

Rates are expressed on basis of active ingredient unless trade product is named. Where weed growth is heavy, treat only a portion of the area at one time to avoid depleting oxygen in the water during decomposition of vegetation. Treatment of entire ponds or lakes heavily infested with aquatic weeds can result in death of fish.

Calculations for amount of herbicide needed on basis of parts per million by weight (ppmw)

Ditch or canal
W = A x L x C x 0.0000625

W = pounds of active ingredient needed
A = cross section area of channel in sq. ft.
L = length of channel in feet
C = desired concentration of herbicide in ppmw

Pond or lake
W = A x D x C x 2.7

W = pounds of active ingredient needed
A = area of water surface in acres
D = average depth in feet
C = desired concentration of herbicide in ppmw

TREATED WATER USE RESTRICTIONS (NUMBERS OF DAYS).

Common Name	Trade Name	Human			Animal	Irrigation		
		Drinking	Swimming	Fish Consumption	Drinking	Turf	Forage	Food Crops
2,4-D	DMA 4 IVM, Hardball, Navigate, AquaKleen	-[ab]	0	0	0	21b[c]	21b[c]	21b[c]
Carfentrazone-ethyl	Stingray	1	0	0	-[d]	14[e]	14[e]	14[e]
Copper Complexes Copper Sulfate	Algimycin PWF, Captain, Clearigate, Current, Cutrine Plus, Cutrine-Ultra, Harpoon, Komeen, K-Tea, Nautique, Symmetry	0[f]	0	0	0	0	0	0
Diquat	Harvester, Redwing, Reward, Weedtrine	1-3	0	0	1	1-3	5	5
Endothall	Aquathol K, Aquathol Super K, Hydrothol 191, Hydrothol Granular	7-25[o]	0	0	7-25	0	7-25	7-25
Fluridone	Avast, Sonar A.S. Sonar One, Sonar PR, Sonar Q, Sonar SRP, Whitecap	0	0	0	0	30	30	30
Glyphosate	Avocet, Aquapro, Rodeo, Shore-Klear, Shore-Klear Plus, Touchdown Pro	0	0	0	0	0	0	0
Imazamox	Clearcast	-[g]	0	0	0	-[g]	-[g]	-[g]
Imazapyr	Aquapier, Gullwing, Habitat	2	0	0	0	120[h]	120[h]	120[h]
Penoxsulam	Galleon	0	0	0	0	-[i]	-[j]	-[k]
Sodium Carbonate Peroxyhydrate	Pak 27, Phycomycin SCP	0	0	0	0	0	0	0
Triclopyr	Renovate3, Renovate OTF	-[l]	0	0	0	-[m]	120	120
Acid Blue #9 & Yellow #23 Dyes	Aquashade, Enviro-Blue	0	0	0	0	0	0	0

[a]See the label distance allowed from potable water intake.
[b]A shorter interval may be used if an approved assay indicates less than 0.1 ppm 2,4-D.
[c]Do not use in ditches where water is used to irrigate highly susceptible crops, such as cotton, grapes, and tomatoes unless an approved assay indicates that 2,4-D concentrations are less than 100 ppb.
[d]Treated water may not be used as a source for livestock until an approved assay indicates carfentrazone-ethyl and degradate is below 0.2 ppm.
[e]This is the interval for applications made to more than 20% of water surface. Consult the label for reduced restriction criteria.
[f]Drinking water restrictions are product-specific; read the label carefully.
[g]Water can be used when an approved assay indicates imazamox concentrations are less than 50 ppb.
[h]Use restrictions can be reduced if an approved assay indicates imazapyr concentrations are less than 1 ppb.
[i]Water treated with penoxsulam can be used for turf irrigation if concentrations are less than 30 ppb.
[j]For other nonfood crop irrigation or for other irrigation uses, contact SePRO Corporation before irrigation if concentrations exceed 1 ppb.
[k]Do not irrigate established food crops, other than rice, until penoxsulam concentrations are no more than 1 ppb in the irrigation water source. Do not irrigate established rice if concentrations in treated water exceed 30 ppb.
[l]Drinking water can be used only when triclopyr concentrations are less than 0.4 ppm by an approved assay.
[m]If triclopyr residues are determined to be nondetectable by an approved assay, there is no restriction for use of irrigation water on established grasses.
[o]The manufacturer suggests a 600-foot potable water application set back.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

CONTROL OF SOME COMMON AQUATIC WEEDS WITH HERBICIDES.

	2,4-D	Carfentrazone-ethyl	Copper Complexes Copper Sulfate[1]	Diquat	Endothall	Fluridone	Glyphosate	Hydrothol 191	Imazamox	Imazapyr	Penoxsulam	Sodium Carbonate Peroxyhydrate	Triclopyr	Acid Blue # & Yellow #23
Algae														
green algae														•[2]
blue-green algae (Cyanobacteria)			•									•		•[2]
filamentous and water net			•	•				•						
Chara and Nitella			•					•						
Floating Weeds (not attached to bottom)														
duckweed		•		•		•				•	•			
common salvinia		•		•			•				•			
giant salvinia		•		•			•				•			
watermeal		•		•		•				•	•			
waterhyacinth	•	•		•			•		•	•	•		•	
water lettuce		•		•			•		•	•	•			
Emergent Weeds (attached to bottom)														
American lotus	•	•		•		•			•				•	
watershield	•	•				•			•				•	
white waterlilly	•	•				•			•	•			•	
frogbit	•	•								•	•		•	
water pennywort		•		•					•	•				
Submersed Weeds														
bladderwort				•	•	•			•					
coontail				•	•	•							•	
bushy pondweeds (*Najas*)				•	•	•								
parrotfeather	•	•		•	•	•				•	•		•	
Eurasian watermilfoil	•	•		•	•	•					•		•	
fanwort						•							•	
pondweeds (*Potamogeton*)				•	•	•								
elodea			•	•		•								
hydrilla		•	•	•	•	•		•			•			
spikerush	•					•								
Marginal Weeds														
alligatorweed	•	•		•		•	•		•	•			•	
water primrose	•	•		•		•	•		•	•			•	
smartweed	•			•		•	•		•	•			•	
arrowhead	•			•		•				•			•	
willows	•						•			•			•	
cattail				•			•		•	•				
cutgrass				•			•			•				
bulrush							•			•				
burweed	•													
phragmites							•		•	•			•	

NOTE: It is not intended that any suggested usage in this table be in violation with existing regulations or manufacturer's label.

[1]Use products containing copper with caution because its toxicity to fish and its effectiveness in controlling aquatic weeds depend on total alkalinity of the water.

[2]May reduce the growth of submersed plant species at higher dye concentrations.

Aquatic weeds	Treatment	Rate	Comments
Algae			
algae	copper sulfate (pentahydrate)	1 to 2 ppmw	Toxicity to fish and algae increases with temperature but decreases with water alkalinity. For water with less than 50 ppm total alkalinity, do not use copper sulfate. For water above 50 ppm, determine the amount of copper to use by dividing total alkalinity (ppm) by 100. This equals the desired copper concentration in the water. Catfish are not very tolerant to copper. Always leave untreated aquatic areas for fish to move into.
	copper complex	0.67 to 0.75 gal per acre-foot	Complexed forms of copper are more active in alkaline water than the sulfate. For water with less than 50 ppm alkalinity, catfish may be killed. Apply a surface spray. Apply when algae begin to grow and water temperature is above 60 °F. Best results when applied on sunny days.
		1.25 to 1.5 gal per acre-foot	Apply when total alkalinity is above 50 ppm.
blue-green (Cyano-bacteria)	sodium carbonate peroxyhydrate	3 to 100 lb per acre-foot	Decaying algae can reduce dissolved oxygen, which can result in fish kills. To avoid oxygen depletion, apply so that 8 to 10 hours of daylight remain. Do not reapply within 48 hours.
Floating			
duckweed	diquat	1 gal per surface acre	Foliar spray or injection in nonflowing water. **Do not** apply diquat to muddy water. Apply as overall spray in 50 to 150 gallons of water plus 1 pint of nonionic surfactant. Spray marginal areas to reduce reinfestation. Retreat if necessary.
giant salvinia	diquat	0.5 to 0.75 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v. Repeat treatments may be necessary for complete control.
	glyphosate	1 to 2 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v.
	carfentrazone-ethyl	0.21 to 0.42 qt per surface acre	Use with an approved aquatic wetting agent at 0.25–1% v/v. Repeat treatments may be necessary for complete control.
waterhyacinth	DMA-4 IVM	0.5 to 1 gal per surface acre	Spray when plants are actively growing. Delay use of treated water for irrigation or domestic purpose for 3 weeks or until approved assay shows no more than 0.1 ppm 2,4-D acid. For use in water bodies that are still or slow moving. Must be applied by trained or licensed applicators. **Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip.
	Hardball	0.25 to 0.5 gal per surface acre	
Submersed			
elodea	diquat	2 gal per surface acre	Inject or apply on surface of nonflowing water. **Do not** apply diquat to muddy water.
Eurasian watermilfoil	DMA-4 IVM	0.5 to 1 gal per acre-foot	**Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip. **Do not** treat within ½ mile of potable water intakes. Treat in spring when milfoil starts to grow. Spray on or inject under water.
	Renovate3	0.7 to 2.3 gal per acre-foot	
	Renovate OTF	20 to 270 lb per surface acre	Application rate is dependent upon the mean water depth in the treated area. Potable water set back distances are dependent upon the total area treated; consult the label for proper set-back distances. Applications should be made in the spring or early summer to actively growing plants.
	Hardball	1 to 5 gal per acre-foot	
	diquat	1 to 2 gal per surface acre	Distribute evenly over infested area. Inject or apply on surface of slow-flowing water. **Do not** apply diquat to muddy water.
	endothall (Aquathol Super K)	0.5 to 2.5 ppmw	Safer to fish than dimethyalkylamine salts. Spray or inject liquids under water. Apply granules evenly with cyclone seeder. Apply as soon as possible after weeds begin to grow and water temperature is above 65 °F. When treating in sections, treat on a 5- to 7-day interval. Use higher rates when spot treating.

Aquatic weeds	Treatment	Rate	Comments
Submersed			
Eurasian watermilfoil	2,4-D (20% granules)	100 to 200 lb per surface acre	Best results when applied in spring to early summer during early growth stage. Apply uniformly using portable spreader (cyclonic seeder). Rate depends upon weed species, weed mass, water depth, and water pH. Repeat application if needed. **Do not** use water for agricultural purposes, watering dairy animals, or domestic purposes.
bladderwort coontail	2,4-D (20% granules)	150 to 100 lb per surface acre	Rates are based on type of water body treated and average water depth. See label for details. **Do not** use water for irrigation from ponds for 30 days or lakes for 7 days after treatment.
elodea hydrilla naiad pondweed coontail Eurasian watermilfoil	Sonar AS	0.5 to 4 qt per surface acre	Fluridone requires a long contact time (more than 60 days) to be effective. A test available from the manufacturer may be advisable for some water bodies to ensure that adequate concentrations of herbicide remain in the waterbody for effective control.
	Sonar PR Sonar SRP	10 to 80 lb per surface acre	
	Biological control		Grass carp can be stocked in ponds and lakes to suppress submersed aquatic plants. Grass carp are typically stocked at rates of 5–30 fish per acre, depending on the size and extent of plant infestation. In new ponds, 2- to 6-inch fish can be stocked. However, in ponds with established bass populations, 8- to 10-inch carp should be stocked to prevent bass from eating them. Grass carp are somewhat specific about which plants they will eat. They prefer tender, nonwoody vegetation and are best suited for control of submersed plants such as some pond-weeds, bushy pondweeds, hydrilla, egeria, and some macro-algae. As grass carp grow, consumption of plant material will decrease. Additional fish should be stocked about every 5 years to maintain plant suppression.
Emergent and Marginal			
alligatorweed	Biological control		Chemical treatment may not be necessary if specific biocontrol insects, the alligatorweed flea beatle (*Agasicle hygrophila*) and/or stem borer moth (*Vogtia malloi*), are present. The flea beetle is more active in the southern part of the state, and the stemborer is active throughout the state. These insects may not provide control in areas adjacent to fields subject to heavy insecticide usage; e.g., near cotton fields. Contact your county agent or a qualified entomologist for positive identification.
arrowhead	DMA 4 IVM	0.5 to 1 gal per surface acre	Spray on foliage. Use only formulations labeled for aquatics.
	Hardball	0.25 to 0.5 gal per surface acre	
cattail	glyphosate	3 to 5 qt per surface acre	Spray on foliage. See Rodeo entry below.
cattail pondlily waterlily	imazapyr 2 lb ae/gal	2 to 3 pt per surface acre or 1% solution	Spray on foliage. Add 1 quart of aquatic-approved nonionic surfactant per 100 gallons of spray solution.
Actively growing (floating or emersed) grasses, broadleafs and brush	glyphosate	1.5 to 7.5 pt per surface acre or spot treatments use 0.75 to 1.5% solution	For application to floating or emerged vegetation, undesirable shoreline weeds and brush by air, booms, or handheld equipment using 3 to 20 gallons of spray per acre. Do not expect control of vegetation that has a majority of the leaf surface submerged. Add 1 to 2 quarts of nonionic surfactant to 100 gallons of spray, but use only X-77 if applications are made to aquatic sites. For hand guns, use 3 to 6 quarts of Rodeo in 100 gallons of water depending upon weed species. Spray to wet. For broadcast application, use 1.5 to 2.5 pints for small annuals and 3 to 7.5 pints for perennial weeds and brush.
Emergent broadleafs	Renovate 3	2 to 8 qt per surface acre	Use a nonionic surfactant at 1% v/v.
	carfentrazone-ethyl	4 to 14 oz per acre	Use a nonionic surfactant at 1% v/v. Repeat applications as necessary.
	DMA 4 IVM	0.5 to 1 gal per surface acre	For control of aquatic weeds in lakes, ponds, drainage ditches, and marshes. Apply 2.5 to 4.5 pints per acre of 3.8 pounds per gallon or 1.67 to 3 pints per acre of 5.64 pounds per gallon formulation in 50 to 100 gallons of water. Spray to wet foliage thoroughly. Apply when leaves are fully developed, actively growing, and are above the water level. Restrict applications to one-third to one-half of lake or pond. Repeat treatment once if needed.
	Hardball	0.25 to 0.5 gal per surface acre	

NONCROPLAND

(Herbicides to control all vegetation)

Recommended rates of the herbicides listed below will kill all vegetation. Low rates, and soils of high clay and organic matter or poor distribution of the herbicide, will all increase the number of escaped weeds and make a repeat application needed. Residual herbicides should never be applied near crops, lawns, shrubbery, or other desirable vegetation or where such plants will be planted within one to four years. The soil life of the herbicide depends on soil type, the particular herbicide, and the rate used. Less "runoff" or lateral movement can be expected where the application is made to a dry soil. Some herbicides are taken up only through the root system, whereas others are foliage- and root-absorbed. In many cases, a combination of a foliar active herbicide and a residual soil herbicide is required to provide "burndown" and residual activity. Spring treatments will control annual weeds, but fall applications often are needed for control of deep-rooted perennial weeds. Use chemicals with care around valuable plant species on ditch banks and turnrows or where water may wash them to other areas. Do not contaminate water supplies or irrigation water. Read the label before using.

Always calibrate sprayers before herbicide application. For foliar applications, the spray volume will usually vary between 30 and 40 gallons an acre for light to moderate vegetation; whereas, 100 to 200 gallons an acre are often required for large dense vegetation. Mix the suggested per acre rate of herbicide in appropriate volumes of water and spray to wet the vegetation. Labels sometime give specific mixing instructions for foliar herbicide applications.

It is often desirable to know the length of an acre when band spraying areas such as fencerows, rights-of-way, etc. Below are several examples:

Band width (ft)	Distance required to treat one acre	
	Ft	Miles
1	43,560	8.25
2	21,780	4.13
3	14,520	2.75
4	10,890	2.06
5	8,712	1.65
10	4,356	0.8

Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft per acre		Comments
atrazine			Atrazine will provide good residual activity to shallow-rooted annual and perennial plants. Add surfactant for foliar activity. Use high rates for perennial weeds. The addition of contact or systemic herbicides may be considered to control broad-spectrum vegetative problems. **Do not** exceed 10 lb ai/A/year.
4 lb/gal	2.2 - 3.6 oz	6 - 10 qt	
90% DF	2.0 - 4.0 oz	5.3 - 11.1 lb	
bromacil			An effective bare-ground herbicide for johnsongrass and other perennial grasses. Use low rates for annual weeds and higher rates for hard-to-kill perennial weeds. The liquid formulation is not compatible with MSMA, Oust, 2,4-D esters, or other acidic formulations.
80% WP	1.1-5.5 oz	3-15 lb	
2 lb/gal	0.40-2.2 pt	2-12 gal	
4% G	2.3-14 lb	100-600 lb	
bromacil 53% + diuron 27% Krovar II DF	0.75-8.4 oz	2-23 lb	
bromacil 2% + diuron 2% Weed Blast 4G	4.6 - 9.2 lb	200 - 400 lb	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 9.

Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
dichlobenil			For general weed control and for under asphalt. Apply to the finished grade and cover area soon after application with asphalt. Dichlobenil has a shorter soil life then bromacil or prometone, but is less injurious to nearby trees and shrubbery. For general control using surface applications, consult individual labels. Apply when air temperature less than 60 °F for best results.
4% G	5.75-7 lb	250-300 lb	
10% G	2.3-2.8 lb	100-120 lb	
50% WP	7.5-9.0 oz	20-24 lb	
diuron 90% DF	1.8-5.5 oz	5-15 lb	Highly effective for seedling control after perennials have been controlled. Should be applied in late winter or early spring. The addition of a contact or systemic herbicide might be considered for improved control of broad-spectrum problem situations.
diuron 80% WP	1.8-7.3 oz	15-20 lb	
or			
simazine 80% WP	2.2-4.4 oz	6-12.5 lb	
4 lb/gal	0.37-7.4 oz	5-10 qt	
90% DF	1.8-4.0 oz	5-11.1 lb	
4% G	5.75 lb	250-450 lb	
diuron 40% + bromacil 40% Krovar I	1.5-11.0 oz	4-30 lb	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.
diuron 62.22% imazapyr 7.78% Sahara	0.30-0.44 lb	13-19 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
diuron 2% imazapyr 0.5% TopSite	4.6-6.88 lb	200-300 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
prometon			
Pramitol 25 E	1-5.5 pt	5-30 gal	For use on industrial sites, noncropland, and beneath asphalt pavement. Provides long-lasting residual control. Use higher rate for deep-rooted perennials or beneath asphalt. Do not apply where any roots of desirable plants will enter the treated areas.
Pramitol 5 PS	5-20 lb	217-870 lb	A pelleted herbicide mixture containing chlorate-borate-simazine and prometone. Should be applied before plant growth begins. Will provide more effective control of shallow-rooted plants than prometone alone.
sodium chlorate 30% + sodium metaborate 68%	10-30 lb	435-1,300 lb	There are many formulations available of sodium chlorate + sodium metaborate containing varying amounts of the chlorates-borates. Increase the rate for more dilute formulations. The borate addition reduces fire hazard and provides more effective long-term control of shallow-rooted young plants. Apply before germination of weeds for best results. Also useful before application before paving under asphalt. Very little lateral movement in soils generally occurs. Control can be expected for about one year.

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
sodium chlorate + sodium metaborate + residual herbicide			There are many formulations available containing varying concentrations of these herbicides. There are several granular as well as liquid formulations. Bromacil and prometone are two of the most soluble residual herbicides and can be expected to control deep-rooted perennial plants. These may move from the site of application. Atrazine and diuron are perferred where lateral movement by surface water is expected or where shallow-rooted annual and perennial plant control is desired.
chlorate 30-40% +			
borates 47-65% +	10-30 lb	435-1,304 lb	
bromacil 1.5-4%	20-40 lb	870-1,739 lb	
(or)			
diuron 1.25%	2.5-10 lb	110-435 lb	
(or)			
prometon 5%	5-20 lb	217-870 lb	
sulfometuron 75% Oust	0.07-10.18 oz	3-8 oz	For use on noncropland, industrial sites, and beneath asphalt pavement. Rate varies with weed type. Desirable plants may be injured if their roots extend into the treated areas.
tebuthiuron 1% diuron 3% Spraykil SK-13	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron 2% diuron 6 % Sparaykil SK-26	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron			Very effective on broadleaf and woody plants. Has good activity on privet. Use high rates for perennial grass and shrub control. Apply in winter or early spring. Add a contact herbicide if rapid kill of established weeds is desired. Best control of woody plants is obtained when applied in the spring when rain will leach the herbicide into the soil.
Spike 80% WP	1.8-7.3 oz	5-20 lb	
Spike 5% G	1.8-7.3 lb	80-320 lb	
Spike 85% DF	1.7-6.9 oz	4.75-18.7	
Velpar 90% SP	0.75-4.4 oz	2-12 lb	Apply spray in 25 to 100 gallons of water just before or soon after weeds emerge. Use medium to high rates on hard-to-kill species, fine-textured soils or soils with high organic matter, or where season long bare ground is desired. For brush control use medium rates and apply in late winter to early summer as a coarse spray underneath the brush. Lower rates may be used for short-term control or only postemergence control for many annual species. Add 1 quart surfactant to 100 gallons of spray.
Velpar L	3.0-15 oz	1 to 6 gal	

Foliage Treatments

Herbicide	1,000 sq ft	Rate/Acre	Comments
2,4-D, 2,4-DP, MCPA, mecoprop, (MCPP), triclopyr, dicamba, or dichlorprop (2,4-DP).	0.75-3 oz	1 to 4 lb a.i. (or) 1-4 qt of 4 lb/gal formulation	For control of broadleaf species only. Use low-volatile esters during cool or drouthy conditions but not when temperatures or windy conditions present drift problems. Repeat as necessary — provides short-term control. Apply in 50 to 100 gallons water with surfactant to uniformly cover broadleaf weeds. Apply when plants are actively growing. Rates are especially effective on woody plants. Reduced rates may be used for herbaceous broadleaf plants.
Note: There are many prepackage mixtures containing 2,4-D plus one to three other herbicides all of which can be very effective on a wide variety of broadleaf weeds. Herbicides such as 2,4-DP, MCPA, MCPP, dicamba, and triclopyr are all excellent broadleaf herbicides each having a little different spectrum of weed control. See woody plants section for additional information. See labels for specific rates and for weeds controlled. In some cases, you should mix grass herbicides such as MSMA or Roundup to provide total vegetation control. See individual section for suggested rates.			
amitrole			Use low rates for annual grasses, broadleaf weeds, poison ivy, and poison oak. Medium rates are for honeysuckle, kudzu, and perennial grass suppression. High rate is for large perennial grasses and woody plants. Apply in 100 gallons/A to wet all foliage after it has fully developed but before frost. Spot treat any regrowth. Amitrole may be mixed with 2,4-D, atrazine, diuron, or simazine for more effective control.
Amitrole T-21% liquid	3-6 oz	1-2 gal	
Amizol-90% powder	6-24 oz	2-8 lb	
Also available under several other trade names			
diquat Reward	0.75-1.5 oz	1-2 qt	Applied to fully wet all foliage. Provides kill or "burn back" of most succulent plants. Useful around buildings, walkways, fences, dry ditches, and clear aquatic areas. **Do not** use treated water for animal consumption, spray, or irrigation within 10 days after treatment.
fluazifop Fusilade DX	0.74-1.1 oz	8-16 oz	Apply as a foliar spray for control of annual and perennial grasses. Add to spray solution either 0.25% surfactant or 1.0% crop oil concentrate. Apply to cover actively growing grasses. Repeat treatment as needed as regrowth occurs. See cotton and soybean sections for additional suggestions.
fosamine Krenite S		1.5-3.0 gal	Apply to brush in late summer or early fall in water to wet all foliage parts. Injury symptoms appear the following spring as failure to produce new leaf growth or growth suppression. Pines may show a response soon after application.
glyphosate	1.0-3.0 oz	3-4 qt	Apply as a broadcast treatment in 10-40 gallons of water/A containing 0.5% surfactant when weeds are actively growing. For handgun or spot treatments use 2 to 4 quarts in 100 gallons water containing 0.5% surfactant. Retreat to control regrowth.
imazapyr Arsenal 2 lb/gal		2.0-6.0 pt	For control of most annuals and perennials including brush species. May apply preemergence but the preferred treatment, especially for perennials, is foliar applications. Complete kill may require several weeks. Make foliar applications using 20 to 60 gallons spray on acre and add 1 quart surfactant/100 gal spray especially if high spray volumes are used.
MSMA	1.1-2.2 oz	2-4 lb a.i. or 3.0 to 6 pt of 6.0 lb/gal	Apply sufficient water to provide spray coverage - usually 20-50 gallons/A. Use lower rates of MSMA for small annual grasses and upper rates for established perennial grasses. Under adverse growing conditions, use up to 0.5% surfactant. Repeated applications will probably be necessary.
paraquat Gramoxone Extra	0.75-1.1 oz	2.0-3.0 pt	Apply in sufficient water to provide spray coverage — usually 20-50 gallons/A. Add 1 quart of nonionic surfactant/100 gal spray. Kills green vegetation covered. Repeat when needed.
sulfometuron Oust — See Turf Section			

See Woody Plants section for additional foliage treatment suggestions.

EQUIPMENT AND CALIBRATION

Tank-Mixing Precautions

- Read product labels carefully and follow all applicable directions, precautions, and limitations.
- Do not exceed recommended application rates for respective products or maximum allowable application rates for any active ingredient in the tank mix.
- For products packaged in water-soluble packaging, do not tank mix with products containing boron. Also, do not mix in equipment previously used to apply a product mixture containing boron unless the tank and spray equipment have been adequately cleaned. (See Equipment Clean-Out Procedures.)
- Always perform a jar test to ensure the compatibility of products to be tank mixed before mixing a full tank.

Sprayer Agitation

Agitation is an essential design and operational component of the agricultural spray system. Agitation is the hydraulic stirring movement of spray solution. Agitation is necessary to maintain the homogeneous mixture required for uniform performance of the pesticide being applied. Poor agitation usually results in nonuniformity of the pesticide application. This may be most visible as crop injury caused by an excess rate of herbicide when the tank is full or recently refilled. As the tank becomes empty, you may see less control of weeds. The amount of agitation needed for the spray system depends upon the type of agitation being used, the size of the spray tanks, the configuration of the spray tanks, and the type of spray solution being applied. The most common type of agitation system is by-pass agitation where part of the spray pump capacity is used to create agitation inside the spray tanks to maintain a homogenous spray solution.

Spray tank agitation requirements are based on the total size of the spray tanks, the configuration of the spray tanks, and the type of pesticide formulation being applied. The volume of the spray tank agitation also depends on the type of tank agitation system being used. A rule of thumb suggests that about 10 percent of the total tank capacity is needed for sufficient agitation. For example, if the total capacity of two tanks is 300 gallons, then 30 gallons per minute (15 gallons per minute per tank) are needed for adequate agitation when conventional by-pass agitation is used. If the by-pass agitation system has induction jets attached, the total volume required for adequate agitation can be reduced.

In some of the new, very large and irregularly shaped spray tanks, it is more difficult to provide adequate agitation because of the way they are made. These tanks were made to more easily fit the tractor configuration than for spray agitation. More traditional EC, EW and flowable liquid pesticide formulations tend to have lower agitation requirements to maintain a homogenous spray mixture. Some formulation types may be prone to settling, especially if the agitation is inadequate or is stopped. In some situations, you may need to add spray adjuvants. Most agitation problems can be easily corrected with careful design and operation of the agitation system.

Where two or more tanks are used, the agitation system should be designed so that all tanks are agitated continuously once the pesticide is added. The operator must then decide whether to use from both tanks simultaneously or from one tank only. When operating from one tank with a full second tank, two separate pump/control/agitation systems are required to agitate both.

Spray tank agitation systems should include a high-volume spray pump and agitators that are carefully designed and installed. Agitators should be placed in the bottom of the spray tank with jets sweeping towards the ends of the tank so that the tank contents are rolled completely.

Total pump capacity is determined by the agitation requirement and the total nozzle requirement. The pump must have adequate capacity for both needs. If the pump is not large enough, it should be either replaced or a separate pump must be added so that one pump would be delivering the spray boom needs, and one pump would be delivering the agitation system needs.

Sprayer Operation

Agricultural sprayers should be operated so that the required rate of pesticide is delivered to the target site. Do not make applications when conditions are conducive to spray drift, poor spray deposition, or poor target coverage.

- Turn off the spraying system when turning or when booms must be raised to clear obstacles or folded for transport.
- Use check valves in individual nozzle bodies to prevent dripping during turns, transport, or when the sprayer is parked.
- Properly clean the sprayer before transporting, storing, or working in other crops or with other pesticides.

Minimize Drift from Ground Applications

Many variables influence drift from agricultural chemical applications. Focusing on the most important variables provides the applicator the greatest opportunity to minimize off-target movement. Research at Mississippi State University measured the relative importance of variables that influence drift from ground and aerial applications. The tips below are listed in order of importance in reducing drift as found in “Predicting ground boom spray drift” by, D. B. Smith, L. E. Bode and P. D. Gerard, Trans of ASAE 43(3):547-553, 2000.

- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Keep the spray release height and the nozzle to the target distance as low as possible to maintain a uniform application pattern from the nozzle for minimum influence of wind and evaporation. Select the proper nozzle type for the application and the nozzle pattern angle. Set the nozzle tip back or forward at approximately 45 degrees to horizontal to minimize height from boom to target.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Applicators may benefit from spraying when temperature is low and humidity is high and with pressures no greater than 40 psi when using pattern-producing nozzles. Shielded and hooded sprayers may be used to minimize exposure of the spray to wind; however, one drift study found greater drift due to wind turbulence around a shield.

Aerial Drift Reduction

The tips below for reducing drift from aerial applications are listed in order of importance as found in Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators, MAFES Information Bulletin 251, by D. B. Smith, M. H. Willcutt, D. L. Valcore, J. W. Barry and M.E. Teske, Nov. 1993).

- Use the largest droplet size compatible with proper coverage required for the mode-of-action of the pesticide being used. The Department of Agriculture and Commerce Bureau of Plant Industry now requires a minimum of 300 micron vmd spray for glyphosate applications by air.

- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Mississippi regulations require that the outboard nozzles be no more than 70 percent of the wingspan or rotor span. Nozzles placed beyond this boom position contribute to vortex-influenced drift and non-uniform deposition, and they do not increase the effective swath width of the aircraft.

Oklahoma State University Publication E-948, Aerial Pesticide Drift Management, Ron T. Noyes, Dennis Gardisser and Dennis K. Kuhlman, makes this suggestion: "Make applications at a height of 25 to 50 percent of the aircraft wingspan, measured from the top of the canopy to the boom. This will generally equate to a minimum height of 9 to 10 feet to the gear or 10 to 15 feet from boom to target canopy. Flying too low can lead to narrow swaths, non-uniform distribution, and streaking. It may also lead to increased drift potential due to the excessive control surface movements generally associated with 'wheels in the crop' flying. Achieve level flight before spraying and turn off the spray system before pulling up. Do not use excessive aircraft speeds. As air speed increases, the amount of particle breakup and 'rooster tailing' potential increases. Higher airspeeds also increase the hazards of low altitude flying due to reduced pilot reaction time. Equip the spray boom for immediate/positive shut-off through properly installed bleed lines and well-maintained equipment. Attend educational meetings frequently and read all published information possible to increase your knowledge about factors that contribute to drift."

Sprayer Clean-Up

Thoroughly clean the sprayer after completion of the application, before repairs and maintenance, and before equipment storage or making other applications. Thorough cleaning will reduce the potential for product residues being dislodged during subsequent applications or worker exposure to pesticide residues and fumes from welding during repairs and maintenance.

At the End of the Day

At the end of each day of spraying, rinse the interior of the tank with clean water and then partially fill the tank. Flush the boom and hoses. This will reduce the buildup of dried pesticide deposits that may accumulate in the application equipment.

Upon Completion of the Application

Follow pesticide label directions for cleaning the sprayer. If no specific cleaning compound or procedure is recommended on the pesticide label, follow the procedure below:

- Drain the mixing and loading system, placing any remaining pesticide solution into the sprayer tank. Thoroughly rinse the mix vat, transfer pump, holding tank, and hoses. Clean this equipment with an appropriate spray tank cleaner. Remove and thoroughly clean all filters and screens on the mixing and loading system. Add all rinse water to the sprayer tank, washing the inside of the tank in the process. Apply rinse water to the application area.
- Fill the sprayer tank half full with clean water, washing the inside of the tank in the process; then apply the rinse water to the application area. Flush the boom with clean water. Loosen and physically remove any visible deposits.
- Fill the tank with clean water and 1 gallon of household ammonia (contains 3 percent active). Anhydrous ammonia may also be used at the same or stronger concentrations for every 100 gallons of water. Flush the hoses, boom, and nozzles with the cleaning solution. Then add more water to fill the tank completely. Circulate the cleaning solution through the tank and hoses for at least 15 minutes. Allowing the cleaning solution to sit 12 to 24 hours will result in better neutralization of pesticide residues. Apply the rinse solution to the application area or labeled cropland for the pesticide used.
- Remove the nozzles and screens and clean separately in a bucket containing cleaning agent and water using a soft-bristle brush.
- Repeat step 2 without the nozzles and strainers installed.
- Rinse the tank, boom, and hoses with clean water.
- Thoroughly clean exterior surfaces of spray equipment with a pressure washer or steam cleaner and with cleaning solutions recommended on the pesticide label.
- If the sprayer will be stored for long periods or during freezing weather, add about 2 to 5 gallons of a 50 percent antifreeze solution, allow it to circulate with the pump, and leave it in the sprayer to reduce damage caused by rust, corrosion, and freezing.
- Store the sprayer in a secure area away from frequent human and animal traffic patterns. Always lower raised components, place transmission in park, lock brakes, remove any keys, and lock cab and storage shed doors when leaving any equipment.

***Note:** If other cleaners are used, consult the cleaner label for rinse water disposal instructions. If no instructions are given, dispose of the rinse water on site or at an approved waste disposal facility.

Carefully read and follow the individual cleaner instructions. Consult your ag dealer, applicator, or pesticide manufacturer's representative for a list of approved cleaners.

- CAUTION: Do not use chlorine bleach with ammonia solutions as dangerous gases will form. Do not clean equipment in an enclosed area. Rinse all metal sprayer components thoroughly after using chlorine or ammonia cleaning solutions to prevent rusting.
- Steam clean aerial spray tanks to remove any caked deposits before performing the above cleanout procedure.
- When a tank mix with other pesticides has been applied, examine all cleanout procedures and follow the most rigorous procedure.
- In addition to this cleanout procedure, follow all pre-cleanout guidelines on subsequently applied products, as per the individual labels.
- Properly dispose of all empty pesticide containers, cleaning solutions, and rinse water in accordance with federal, state, and local regulations and guidelines. Triple or pressure rinse all empty pesticide containers and then render them unusable by puncturing the container.
- One accepted method of cleaning solution and rinse water disposal is to apply the rinse water to the field area previously treated. Do not exceed pesticide label recommendations for application rate when applying rinse water.
- Always wear the proper personal protective equipment while filling, cleaning, or working on sprayers.

Spray Tips for Successful Applications

The success of a crop chemical depends on its proper application as recommended by the chemical manufacturer. Proper selection and operation of spray nozzles are very important steps in accurate chemical application. The volume of spray passing through each nozzle plus the droplet size and spray distribution on the target influence weed control.

There is evidence that spray tips may be the most neglected component in today's farming; yet they are among the most critical of items in proper application of agricultural chemicals. For example, a 10 percent over-application of chemical on a twice-sprayed 1,000-acre farm could represent a loss of $2,000-$10,000 based on today's chemical investment of $10-$50 per acre. This does not take into account potential crop damage.

Careful cleaning of a clogged spray tip can mean the difference between a clean field and one with weed streaks. Flat spray tips have finely machined openings to control the spray. Damage from improper cleaning can cause both an increased flow rate and poor spray distribution. Be sure to use recommended strainers in your spray system to minimize clogging. If a tip clogs, use a soft-bristled brush or toothpick to clean it—**never** use a metal object. Use extreme care with soft spray tip materials such as plastic.

A wide selection of equipment is available for application of herbicides for weed control. Follow the manufacturer's guidelines for each specific type of equipment. Selection of the proper nozzle for the desired end-use is critical for proper calibration and application. Available nozzle types, spray patterns, and uses are presented in Table 3.

Precalibration check

Be sure that all sprayer components are free of foreign material and function properly. Inspect nozzle tips and internal parts for obvious wear, defects, proper size and type. Check the flow rate of each nozzle using water. Establish the desired operating pressure and check for uniform output, equal fan angle, and uniform appearance of spray pattern. Replace any nozzle tips having 5 percent more or less than the average flow rate of the other nozzles and/or having obviously different fan angles or patterns. If the average flow rate of the old nozzle tips differs from the flow rate of new nozzle tips or catalog flow rates for new nozzle tips by 10 percent or more, consider replacing with new nozzle tips. Check the flow rate of new nozzle tips before spraying.

Nozzle Height and Uniformity

Type and size of nozzle tip, operating pressure, spray formulation, tip spacing along the boom, tip-to-target distance, fan angle, and angle of nozzle tips in relation to vertical can greatly influence the spray swath uniformity. You can see extreme nonuniformity by spraying onto a prepared surface such as concrete or a dust-covered surface. Rotate fan-type tips approximately 5 degrees from being parallel to the boom so that adjacent spray fans do not interfere with each other. Suggested spray tip heights found in catalogs are a good starting point; however, these tip operating heights may or may not produce the maximum uniformity of application. For a more detailed discussion of spray uniformity and height and recommendations for specific nozzle tips, see Extension Publication 1697 *Improving the Uniformity of Ground Applied Broadcast Sprays* by D.B. Smith and M. H. Willcutt. (Specific recommendations for reducing aerial spray drift can be found in MAFES Information Bulletin 251 *Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators* by D.B. Smith, M.H. Willcutt, D.L. Valcore, J.W. Barry, and M.E. Teske.)

Use this formula to determine nozzle size: $GPM = \frac{GPA \times MPH \times Width}{5{,}940}$

The following web sites may be helpful in selecting nozzles, set-up and calibration of spray equipment:

www.agchem.com	Ag.Chem Equipment Co., Minnetonka, MN55343, 800-760-8800
www.teejet.com	Spraying Systems Co. , Wheaton, IL, 770-552-9292
www.delavanagspray.com	Delavan AgSpray Products, Lexington, TN, 800-621-9357
www.sprayers.com	Sprayer Specialties, Inc. Grimes, IA, 800-351-1587

Always be sure to check the rated operating pressure of nozzles when comparing desired flow to rated flow.

1/128th Acre Calibration for Row- and Boom-Nozzle Sprayers

Calibration of sprayers involves selection of the proper nozzle, spraying pressure, and sprayer speed. See Table 3 for selection of nozzles. There are many ways to determine the right combination of these elements. One practical calibration method is given. For a more in-depth discussion of calibration procedures, see Extension Publication 1006 *Calibration of Ground Spray Equipment.*

The 1/128th acre, baby bottle, and 100-foot methods of calibration are based on spraying 1/128th acre. There are 128 ounces per gallon; therefore, ounces sprayed per 1/128th acre equal gallons sprayed per acre. This procedure results in a treated acre calibration. Broadcast herbicide rates should be added to the volume of water calibrated per treated acre.

1. Determine nozzle spacing or swath width. (Note: if you are making **band** applications and use nozzle spacings, you will figure the gallons of spray per **planted** acre.)
2. Refer to Table 1 on next page for length of calibration course and mark calibration course in the field or 340 ft^2/nozzle swath width (feet) course length.
3. Record time required to drive length of calibration course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain engine rpm used to drive course, and turn on sprayer.
5. Collect all spray from one nozzle for time equal to that required to drive the calibration course.
6. Measure the **ounces** caught. Ounces caught equal gallons per acre of spray applied.
7. Repeat Steps 5 and 6 for several other nozzles.

*** NOTE:** If multiple nozzles are used per row (Figure 4) use the width of area treated by **all nozzles** as the swath width for step 1 and catch the flow from **all** nozzles directed to the row in step 5.

TABLE 1. DISTANCE FOR EACH NOZZLE TO SPRAY 1/128 ACRE.

Effective Swath Width (in)	Course Distance (feet)
6	681
8	510
10	408
12	340
14	292
16	255
18	227
20	204
22	186
24	170
30	136
36	113
38	107
40	102
42	97
48	85

TABLE 2. CALIBRATION LENGTHS FOR BOOMLESS SPRAYERS.

Effective Swath Width (feet)	Course Distance (feet)
15	363
18	302
20	272
22	248
24	227
26	209
28	194
30	182
32	170
34	160
40	136
47	116
50	109
52	105
56	97
60	91

1/8th Acre Calibration for Boomless Sprayers

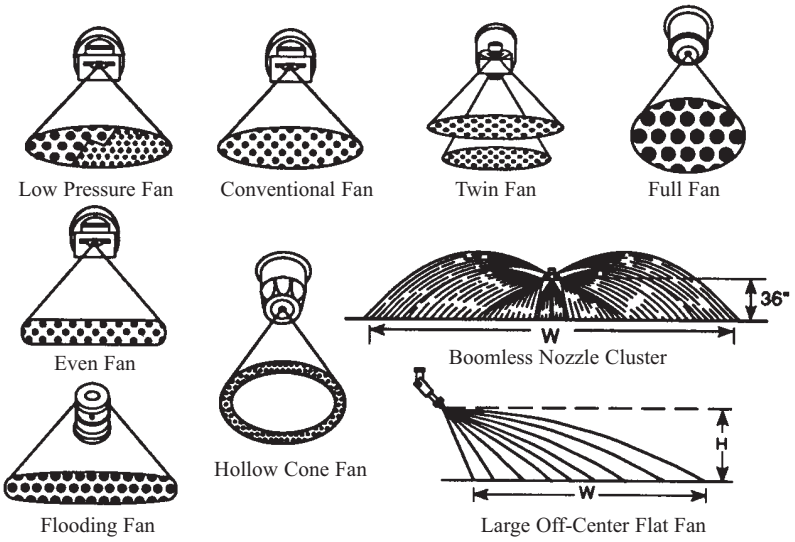
1. Turn on sprayer and measure effective swath width (feet). Note: swath width should be visually assessed when the vehicle is moving at 5 mph with very low wind speed and wind direction is parallel to the direction of travel of the spray vehicle.
2. Refer to Table 2 to determine length of calibration course and mark the calibration course in the field.
3. Record time required to drive course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain same rpm used to drive course, and turn on sprayer.
5. Catch water in plastic garbage bag for time equal to drive the calibration course.
6. Measure the pints caught. Pints collected equal gallons per acre.

TABLE 3. NOZZLE TYPES, SPRAY PATTERNS AND SUGGESTED USES[1].

Type	Spray Pattern	Pressure (psi)	Suggested Use/Comments
Flat Fan	Fan-like pattern of medium droplets. Not uniform across width.	20-40 (15-40 psi for LP nozzle)	Pre- and postemergence, broadcast booms. Available in low pressure tips that reduce clogging and drift potential. Requires 30% overlap for uniform distribution.
Even Fan	Fan-like pattern. Uniform volume across entire width.	20-40	Pre- and postemergence. Good for banding.
Flooding Fan	Wide, flat pattern of coarse droplet.	10-30	Broadcast booms, chemical-fertilizer mixture, layby. Requires 100% overlap for uniform distribution.
Off-Center Flat Fan (up to OCO8)	Flat-fan pattern. Directed to one side of tip. Swath width 20-144 inches.	20-40	Post-directed, low-profile spraying. Larger drops and increased volume deposited on the toe of pattern. Reasonably uniform deposits are not expected.
Large off-Center Flat Fan	Swath directed to one side from 12 to 33 feet width.	30-40	Herbicide application to ditches and roadsides. Reasonably uniform deposits are not expected.
Cone	Circular, with heavy concentration on outside. Small droplets.	40-60	Complete coverage of foliage. Insecticide, fungicide, and growth regulator applications, and Basagran rigs. Use where slight drifting is not hazardous.
Whirl Chamber (Raindrop[tm])	Hollow cone pattern.	5-20	Used on incorporation equipment.
Rotary Atomizers	Flat plane similar to hollow cone. More nearly uniform droplet size.	Device dependent	Low-volume application of herbicides and insecticides.
Boomless Nozzle Cluster	Wide swath (up to 60 feet). Pattern easily distorted by wind. High spray trajectory.	20-40	Pastures and broadcast spraying where obstructions to booms exist. High drift potential. Not suitable for orchard spraying. Reasonably uniform deposits are not expected.

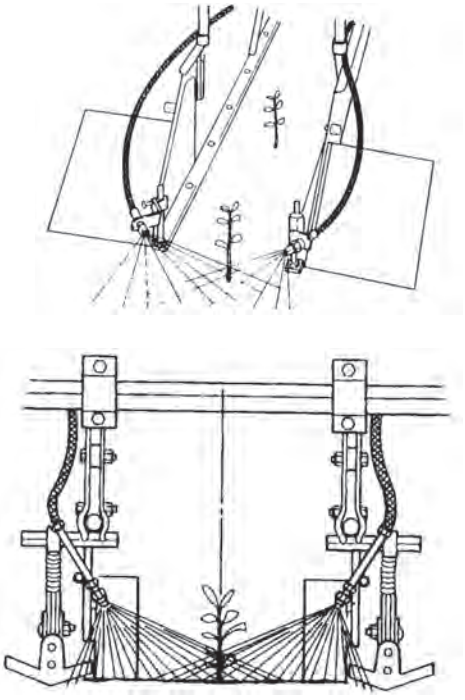
[1]Suggested uses are a composite of recommendations from the manufacturer, research, and Extension. Always follow equipment and chemical label.

Nozzle Patterns



Typical Nozzle Settings

Typical nozzle arrangements for weed control applications are shown in Figures 1-5.



Figures 1 and 2. Flat-fan nozzles for post-direct spraying. Mount nozzle on row shield and direct spray down and back to provide desired overlap and band width.

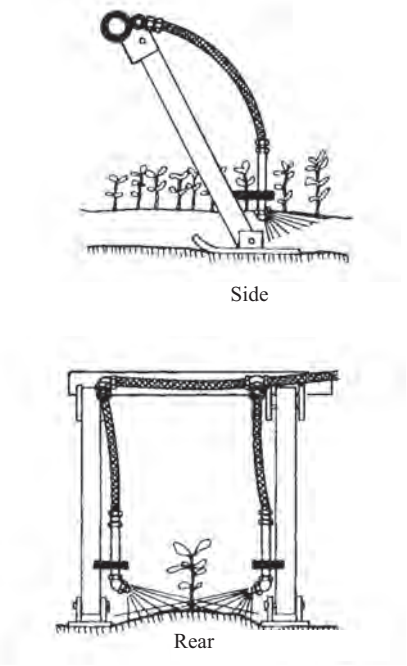


Figure 3. Off-center nozzle for post-direct spraying. Nozzle can be posi tioned further from the crop than regular flat-fan nozzle.

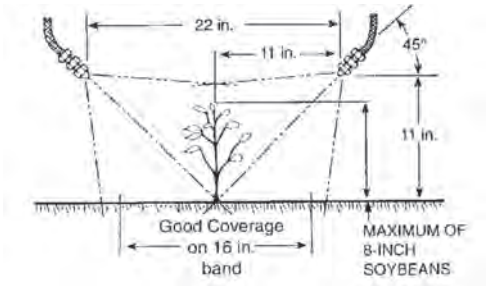


Figure 4. Two-nozzle arrangement for over-the-top applications.

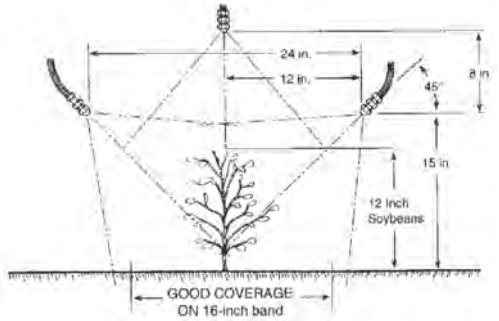


Figure 5. Three-nozzle arrangement for over-the-top applications.

Shielded Sprayers

Shielded sprayers offer a potential to apply herbicides for preplant burn down and in crop post direct with reduced drift and little or no injury to surrounding crops. However, use precautions to prevent drift and resulting crop injury. The shield alone is not enough to permit safe herbicide application when weather conditions are unfavorable. Abide by the normal recommendations for applying herbicides in a manner to reduce drift. Select a nozzle that will produce as large a drop as practical for coverage, spray volume, and control. Lower pressure or extended range nozzles (15 to 20 psi) should be given preference over more conventional nozzles (40 psi) since fine droplet production will be reduced. Set the hood and the nozzles for the lowest position to give adequate coverage of the weeds to be controlled. Angling the nozzles to the rear will usually give better coverage at a lower height as in any post-direct spraying. Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.

Figure 6. Broadcast shielded sprayer operating in "burn-down"

Figure 7. Shielded sprayer in soybeans

Hooded and Shielded Sprayers

Hooded and shielded sprayers offer a potential to apply herbicides for preplant burn down (figure 6 above) and in crop post direct with little or no injury to surrounding crops. A sprayer hood with multiple nozzle configurations is shown in Figure 8. Use precautions to prevent drift and injury to nontarget crops. Do not use when weather conditions are unfavorable for a safe application. During each application, exercise the following precautions:

- Set hood and nozzles for the lowest position to give adequate coverage of weeds to be controlled.
- Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.
- The hood should be operated in contact with the ground and not bounce when using nonselective herbicide in susceptible crops.
- Make sure flaps or curtains extend into the furrow for maximum protection when spraying crops in raised beds.
- Avoid operating a hooded sprayer on sloping ground.
- Maximum operating speed of the tractor and hoods should not be greater than 5 mph with slower speeds preferred for rough or uneven surfaces.
- Leave a minimum of an 8-inch band centered over the drill row untreated when using nonselective herbicides.
- Avoid spraying weeds that are in direct contact with the crop.
- Select low drift, flat fan type nozzles with a 95-degree included spray fan angle that produce medium to large drops suitable for the desired coverage, application, volume, and control.
- Always read and follow herbicide label directions.

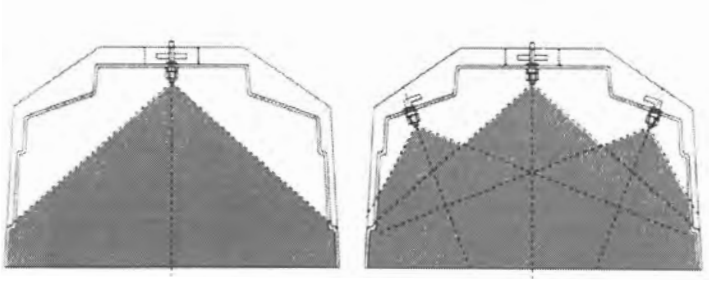


Figure 8. Sprayer hoods with one and three nozzles

Converting Liquid Formulations

$$\text{Volumetric Application Rate (pt/A)} = \frac{8\text{ pt}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Example: To apply 1 lb/A active rate of a 4 lb/gal material

$$\frac{8\text{ pt}}{\text{gal}} \times \frac{1\text{ lb ai/A}}{4\text{ lb ai/gal}} = 2\text{ pt/A}$$

Similar conversion to liquid ounces/acre (oz/A) may be accomplished by:

$$\frac{\text{oz}}{\text{A}} = \frac{128\text{ oz}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Converting Dry Material Formulation

$$\text{Amount of product (lb/A)} = \frac{\text{Technical material rate (lb ai/A)}}{\text{Percent active ingredient (\% ai)}}$$

$$\text{Volumetric Application Rate (oz/A)} = \frac{\text{lb ai/A}}{\text{\% Active}} \times \frac{16\text{ oz}}{\text{lb}}$$

Factors to Convert Broadcast Rate/Acre Banding Applications

$$\text{\% area treated with band} = \frac{\text{Total band width sprayed per pass of implement}}{\text{Total row width covered per pass of implement}} \times 100\%$$

This allows computations for skip-row patterns:

Example: A field planted to 8-40-inch row pattern is 50% treated when a 20-inch band is applied to each row:

$$\frac{8 \times 20}{8 \times 40} \times 100\% = 50\%$$

Conversion Factors

Area Measure

1 square mile (mi^2) = 640 acres
1/4 mi x 1/4 mi = 40 acres
1,320 ft x 1,320 ft = 40 acres
1 acre = 43,560 ft^2
1 acre = 208.7 ft x 208.7 ft
1 acre = 13,068 ft of 40-in. rows
13,756 ft of 38-in. rows
14,520 ft of 36-in. rows
16,335 ft of 32-in. rows
17,424 ft of 30-in. rows
1 acre = 0.405 hectare
1 hectare = 2.47 acres
1 hectare = 10,000 m^2
1 yd^2 = 9 ft^2 = 0.836 m^2
1 ft^2 = 144 in^2 = 0.09 m^2
1 cm^2 = 0.155 in^2

Linear Measure

1 in = 2.54 cm
1 ft = 12 in = 30.48 cm
1 yd = 3 ft = 36 in = 91.44 cm
1 rod = 16.5 ft
1 mi = 5,280 ft = 1.6093 km

Conversion Factors *(continued)*

Volume and Liquid Measure

1 yd^3 = 27 ft^3 = 0.76 m^3
1 ft^3 = 1,728 in^3 = 0.028 m^3 = 7.48 gal
1 bu = 1.25 ft^3
1 gal = 231 in^3 = 4 qt = 8 pt = 16 cups
1 gal = 128 fl oz =3.785 L = 3,785 ml = 3,785 cm^3
1 qt = 2 pt = 4 cups = 32 oz = 0.946 L = 946 ml
1 pt = 2 cups = 16 oz = 0.473 L = 473 ml
1 cup = 8 oz = 0.24 L = 240 ml
1 fl oz = 2 tbsp = 6 tsp = 1.8 in^3 = 0.02957 L = 29.57 ml
1 tbsp = 3 tsp = 0.5 oz = 14.78 ml
1 tsp = 0.166 oz = 4.92 ml
1 ml = 0.0338 fl oz

Mass (Weights)

1 U.S. ton = 2,000 lb = 0.907 metric ton
1 metric ton = 2,205 lb (avoir)
1 lb = 16 oz = 453.6 g = 0.4536 kg
1 oz = 28.35 g

Velocity Measure

1 mph = 5,280 ft/hr = 88 ft/min = 1.467 ft/sec
1 m/sec = 196.85 ft/min = 2.24 mph
1 m/sec = 1.942 knots

Pressure Measure

1 atm = 14.7 psi = 406.8 inches H_20 @ 40 °F
1 atm = 29.92 inches Hg @ 40 °F = 760 mm Hg @ 4 °C
1 atm = 1.01325 bar
1 psi = 27.68 inches H_20 @ 40 °F = 144 lb/ft^2 = 703.06 kg/m^2 @ 4 °C
1 psi = 6.8948 x 10^3 pascals = 6.895 Kpa = 2.036 inches Hg
1 psi = 70.3 g per cm^2
1 pascal = 10 dynes/cm^2 = 1.45 x 10^{-4} psi

Temperature

°C = 5/9 (°F - 32)
°F = (9/5 °C) + 32
°K = °C + 273.16
°R = °F + 459.69

* For additional conversions see http://www.abe.msstate.edu/tools.htm

Abbreviations

A = acres
ai = active ingredient
atm = atmospheres
bu = bushels
cm = centimeters
cm^2 = square centimeters
fl oz = fluid ounces
ft = feet
ft^2 = square feet
ft^3 = cubic feet
g = grams
gal = gallons
H_2O = water
Hg = mercury
in = inches
in^2 = square inches
in^3 = cubic inches
kg = kilograms
km = kilometers
L = liters
mi = miles
ml = milliliters
m = meters
m^2 = square meters
mm = millimeters
mph = miles per hour
oz = ounces
psi = pounds per square inch
pt = pints
qt = quarts
tbsp = tablespoons
tsp = teaspoons
yd = yards
°C = Degrees Celsius
°F = Degrees Fahrenheit
°R = Degrees Rankin
°K = Degrees Kelvin

WEED IDENTIFICATION AND WEB RESOURCES

Good judgment, representative field scouting, and proper weed identification are critical in obtaining appropriate recommendations. Several weed identification publications are available to aid in identifying weeds, such as the Southern Weed Science Society's Southern Weed ID Guide and Encyclopedia of North American Weeds DVD. The Southern Weed ID Guide is available as a manual or DVD with more than 2,400 full-color photographs of 447 weed species, along with an interactive key, distribution maps, and descriptions. The DVD also has an interactive tutorial on principles of weed identification, including plant taxonomy, morphology, and terminology. The Interactive Encyclopedia of North America DVD has an expanded array of weed species and excellent tutorials. Lastly, Forest Plants of the Southeast CD is an excellent weed identification tool with great images and descriptions of wildlife uses for many weeds. For purchasing information, contact the Southern Weed Science Society.

Southern Weed Science Society
205 W. Boutz, Bldg. 4, Ste. 5
Las Cruces, NM 88005
Phone: (575) 527-1888 (weekdays between 9 a.m. and 5 p.m. Mountain Time)
E-mail: SouthernWSS@gmail.com
Web site: www.swss.ws

Other Web Sites of Interest:

Crop Data Management Systems	http://www.cdms.net/
Greenbook Data Solutions	http://www.greenbook.net/
Invasive Plant Atlas of the Mid-South (IPAMS)	http://www.gri.msstate.edu/ipams

GLOSSARY OF HERBICIDES

Efforts were made to determine the chemical companies, trade names, and formulations of herbicides suggested in these guidelines that are labeled with the Mississippi Bureau of Plant Industry. Omission of any products containing the active ingredients listed in this book was not intended.

Use Classification

Certain chemicals have been classified by the U.S. Environmental Protection Agency or the Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry as "Restricted Use" to ensure the safety of persons using them and to ensure the safety of the environment. Only certain formulations may be Restricted Use. Any person who is the end user of these products must be a certified applicator or working under the direct supervision of a certified applicator. To become certified, persons should contact their county Extension office or the Bureau of Plant Industry. All dealers who sell any products that are classified as EPA Restricted Use or State Restricted Use must obtain a dealer license from the Bureau of Plant Industry.

Use classifications are shown in the Glossary for each group of products. Following are the classification categories:

R—Products classified as Restricted Use by EPA. They will contain on the front panel of their labels the wording "Restricted Use Pesticide for retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification," or similar wording.

G—Products for general use (not restricted by EPA). They can be bought and used by the general public without certification.

Abbreviations used in this section:

DF or DFG — Dry Flowable

DG — Dispersible Granules

DS — Dry Soluble

G — Granules

P — Pellets

WDG — Water Dispersible Granules

WDS — Water Dispersible Soluble

WSG — Water Soluble Granules

WP — Wettable Powder

WS — Water Soluble Powder

WSB — Water Soluble Bag

WSP — Water Soluble Packet

Common chemical name	Company	Trade names and formulations	Use classification
2,4-D	Loveland Prod.	Amine 4 2,4-D Weed Killer — 46.5%	G
2,4-D	Voluntary Purch. Groups	Hi-Yield 2,4-D Amine No. 4 — 47.3%	G
2,4-D amine	Albaugh	2,4-D Amine 4 — 46.8%	G
2,4-D amine	Alligare	Alligare 2,4-D Amine — 46.8%	G
2,4-D amine	Dow Agrosciences	DMA 4 IVM — 46.3%	G
2,4-D amine	Dow Agrosciences	GF-2654 — 56.3%	G
2,4-D amine	Helena Chem. Co.	2,4-D Amine 4 — 46.8%	G
2,4-D amine	Helena Chem. Co.	Barrage HF — 78.1%	G
2,4-D amine	Helena Chem. Co.	Hardball — 19.6%	G
2,4-D amine	Helena Chem. Co.	Opti-Amine — 46.7%	G
2,4-D amine	Helena Chem. Co.	Unison — 19.6%	G
2,4-D amine	Helena Chem. Co.	Weed RHAP A-4D — 46.7%	G
2,4-D amine	Loveland Prod.	Clean Amine — 46.5%	G
2,4-D amine	Loveland Prod.	Savage Dry Sol. Herb. — 95%	G
2,4-D amine	Makhteshim-Agan	Defy Amine 4 — 47.2%	G
2,4-D amine	Nufarm	Nufarm Weedar 64 (24c) use on Rice — 46.8%	G
2,4-D amine	Nufarm	Nufarm Weedar 64 Broad. Herb. — 46.8%	G
2,4-D amine	Nufarm Americas	2,4-D 6 Amine — 66.8%	G
2,4-D amine	Nufarm Americas	Riverdale Solution Water Sol. IVM — 96.9%	G
2,4-D amine	Nufarm Americas	Solution Water Sol. — 96.9%	G
2,4-D amine	Nufarm Americas	UAP Timberland Platoon — 47.3%	G
2,4-D amine	Nufarm Americas	WeeDestroy AM-40 — 46.8%	G
2,4-D amine	PBIGordon Corp.	Gordon's Amine 400 2,4-D Weed Killer — 46.47%	G
2,4-D amine	Ragan and Massey	Compare-N-Save 2,4-D Amine Salt Broad. Weed Cont. — 46.8%	G
2,4-D amine	Sepro Corp.	Sculpin G — 20%	G
2,4-D amine	South. Ag. Insecticides	2,4-D Amine Weed Killer — 46.8%	G
2,4-D amine	Tacoma Ag	2,4-D Amine 4 — 47.2%	G
2,4-D amine	Tacoma Ag	2,4-D Ester 4 — 68%	G
2,4-D amine	Tacoma Ag	2,4-D Ester 6 — 88.4%	G
2,4-D amine	Tenkoz	Tenkoz Amine 4 2,4-D Herb. — 46.8%	G
2,4-D amine	Universal Crop Prot. Alliance	2,4-D Amine Weed Killer — 47.2%	G
2,4-D amine	Universal Crop Prot. Alliance	2,4-D LO-V Ester Weed Killer — 65.1%	G
2,4-D amine	Voluntary Purch. Groups	Hi-Yield 2,4-D Sel. Weed Killer — 11.84%	G
2,4-D amine	Winfield Solutions	2,4-D Amine 4 — 47.3%	G
2,4-D amine	Winfield Solutions	Rugged — 38.4%	G
2,4-D amine	Winfield Solutions	Shredder Amine 4 — 47.3%	G
2,4-D B	Aceto Ag. Chem. Corp	2,4-DB 175 Herb. — 23%	G
2,4-D B	Aceto Ag. Chem. Corp.	2, 4 DB 200 Herb. — 26.2%	G
2,4-D B	Applied Biochemists	Navigate — 27.6%	G
2,4-D ester	Alligare	Alligare 2,4-D LV 6 — 88.4%	G
2,4-D ester	Loveland Prod.	Low Vol 4 Ester Weed Killer — 65.5%	G
2,4-D ester	Loveland Prod.	Low Vol 6 Ester Weed Killer — 88.8%	G
2,4-D ester	Loveland Prod.	Salvo — 81.8%	G
2,4-D ester	Loveland Prod.	Whiteout 2,4-D — 60.8%	G
2,4-D ester	Makhteshim-Agan	Defy LV-4 — 68%	G
2,4-D ester	Makhteshim-Agan	Defy LV-6 — 88.4%	G
2,4-D ester	Nufarm	Nufarm Weedone 650 Solventless Herb. — 87.3%	G
2,4-D ester	Nufarm	Nufarm Weedone LV4 EC — 67.2%	G
2,4-D ester	Nufarm	Nufarm Weedone LV4 Solventless — 62.6%	G
2,4-D ester	Nufarm	Weedone LV6 EC Herb. — 87.3%	G
2,4-D ester	PBIGordon Corp.	Gordon's LV 400 2,4-D Weed Killer Solvent Free — 61.74%	G
2,4-D ester	Tenkoz	Tenkoz Lo-Vol 4 2,4-D Low Volatile Herb. — 63.7%	G
2,4-D ester	Winfield Solutions	2,4-D LV4 — 66.2%	G
2,4-D ester	Winfield Solutions	2,4-D LV6 — 88.8%	G
2,4-D ester	Winfield Solutions	E-99 — 87.4%	G
2,4-D ester	Winfield Solutions	Shredder 2,4-D LV4 — 66.2%	G
2,4-D ester	Winfield Solutions	Shredder 2,4-D LV6 — 88.8%	G
2,4-D ester	Winfield Solutions	Shredder E-99 — 87.4%	G
2,4-D ester	Winfield Solutions	SWB 2,4-D LV4 — 61.74%	G
Acetic acid	Albaugh	2,4D LV 4 — 63.7%	G
Acetic acid	Albaugh	Solve 2,4D — 61.74%	G
Acetic acid	Fleischmann's Vinegar Co.	Weed Cont. — 20%	G

Common chemical name	Company	Trade names and formulations	Use classification
Acetic acid	Greenstar Plant Prod.	Grotek Elimaweed Weed & Grass Killer — 7.15%	G
Acetic acid	Lady Bug Natural Brand	Green Go Grass & Weed Killer RTU — 6.25%	G
Acetochlor	Dow Agrosciences	Acetochlor Tech. — 95.4%	G
Acetochlor	Dow Agrosciences	Acetochlor Tech. — 95.4%	G
Acetochlor	Dow Agrosciences	Surpass EC — 70.87%	G
Acetochlor	Dow Agrosciences	TopNotch — 33.68%	G
Acetochlor	DuPont	DuPont Breakfree Herb. — 70.87%	G
Acetochlor	Loveland Prod.	Cadence Herb. — 70.87%	R
Acetochlor	Monsanto Co.	Agrisolutions Confidence Herb. — 74.8%	G
Acetochlor	Monsanto Co.	Degree Herb. — 42%	G
Acetochlor	Monsanto Co.	Harness 20G Granular Herb. — 20%	G
Acetochlor	Monsanto Co.	Harness Herb. — 74.8%	G
Acetochlor	Monsanto Co.	Warrant Herb. — 33%	G
Acifluorfen	Direct Ag Source	Uproar — 20.1%	G
Acifluorfen	Summit Agro USA	Acifluorfen 2L — 20.1%	G
Acifluorfen	United Phosphorus	Ultra Blazer — 20.1%	G
Alachlor	Monsanto Co.	IntRRo Preemergent Herb. — 45.1%	R
Alachlor	Monsanto Co.	Micro-Tech Herb. — 41.5%	R
Ametryn	Syngenta Crop Prot.	Evik DF Herb. — 76%	G
Amicarbazone	Arysta Lifescience	Xonerate Herb. — 70%	G
Aminocyclopyrachlor	DuPont	DuPont Aminocyclopyrachlor Tech. — 89.3%	G
Aminocyclopyrachlor	DuPont	DuPont Aptexor Manufacturing Conc. — 10%	G
Aminocyclopyrachlor	DuPont	DuPont Aptexor Tech. — 89.3%	G
Aminocyclopyrachlor	DuPont	DuPont Method 240SL Herb. — 25%	G
Aminocyclopyrachlor	DuPont	DuPont Method 50SG Herb. — 50%	G
Aminocyclopyrachlor	Scotts Co.	Snap Pac South. Weed & Feed 2 32-0-8 — 0.02%	G
Aminocyclopyrachlor	Scotts Co.	Touch Up Spot Weed Cont. for South. Lawns — 0%	G
Aminocyclopyrachlor	Scotts Co.	Turf Builder Bonus S South. Weed & Feed 32-0-8 — 0.02%	G
Aminopyralid	Dow Agrosciences	Milestone — 40.6%	G
Aminopyralid	Dow Agrosciences	Milestone VM — 40.6%	G
Ammonium soap	Bayer Advanced	Bayer Advanced Natria Grass & Weed Killer RTU — 3.68%	G
Ammonium soap	Lawn and Garden Prod.	Herbicidal Soap — 22%	G
Ammonium soap	S.C. Johnson & Son	Earth Options by Raid Grass & Weed Killer — 3.68%	G
Ammonium soap	S.C. Johnson & Son	Raid Earth Options Grass & Weed Killer — 3.68%	G
Ammonium soap	Schultz Co.	Garden Safe Brand Weed & Grass Killer — 3.68%	G
Asulam	Helena Chem. Co.	Asulam 4 F — 36.2%	G
Asulam	United Phosphorus	Asulox Herb. — 36.2%	G
Asulam	Winfield Solutions	Asulam 3.3 Herb. — 36.2%	G
Atrazine	Ambrands	Image Herb. for St. Augustinegrass & Centipedegrass — 4%	G
Atrazine	Ambrands	Image Herb. for St. Augustinegrass & Centipedegrass RTS — 4%	G
Atrazine	Drexel Chem. Co.	Drexel Atra-5 — 52.5%	R
Atrazine	Drexel Chem. Co.	Drexel Atrazine 4L — 42.2%	R
Atrazine	Drexel Chem. Co.	Drexel Atrazine 90DF — 88.4%	R
Atrazine	Drexel Chem. Co.	Drexel Auguzine — 4%	G
Atrazine	Helena Chem. Co.	Atrazine 4 L — 41.12%	R
Atrazine	Helena Chem. Co.	Helena Atrazine 4 F — 42.6%	R
Atrazine	Helena Chem. Co.	Helena Atrazine 90-DG — 88.2%	R
Atrazine	Loveland Prod.	Atrazine 4L Herb. — 42.2%	R
Atrazine	Loveland Prod.	Atrazine 90 WDG Herb. — 88.5%	R
Atrazine	Makhteshim-Agan	Atrazine 4L Herb. — 42.9%	R
Atrazine	Makhteshim-Agan	Atrazine 90 DF — 88.5%	R
Atrazine	Makhteshim-Agan	MANA Atrazine 90DF — 88.2%	R
Atrazine	Ortho Group	Ortho Weed B Gon Spot Weed Killer for St. Augustine — 0.6%	G
Atrazine	Ortho Group	Total Kill South. Lawn Weed Killer for St. Augustine & Centipede w/ Atrazine — 4%	G
Atrazine	Scotts Co.	Bonus S 29-3-4 — 1.06%	G
Atrazine	Scotts Co.	Bonus S Winterguard 22-3-11 — 1.29%	G
Atrazine	Scotts Co.	Expert Gardener St. Augustine Weed & Feed 23-0-4 — 1.25%	G
Atrazine	Scotts Co.	Expert Gardener St. Augustine Weed & Feed 29-3-4, 29-0-4 — 1.25%	G
Atrazine	Scotts Co.	SLS Fert. w/ Minors + Atrazine 20-2-10 — 0.92%	G
Atrazine	Scotts Co.	Snap Pac South. Weed & Feed 32-0-4 — 1.44%	G
Atrazine	Scotts Co.	Super Bonus S 26-2-14 — 1.17%	G

Common chemical name	Company	Trade names and formulations	Use classification
Atrazine	Scotts Co.	Super Bonus S 30-3-10 — 0.93%	G
Atrazine	Scotts Co.	Weed & Feed for St. Augustinegrass 28-3-4 — 1.29%	G
Atrazine	Sipcam Agro USA	Atrazine 4L Herb. — 41.9%	R
Atrazine	Sipcam Agro USA	Atrazine 90 DF Herb. — 87.72%	R
Atrazine	South. Ag. Insecticides	Atrazine 4% St. Augustine Lawn Weed Killer — 4%	G
Atrazine	Spectrum Group	Spectracide Weed Stop for Lawns for St. Augustine & Centipede Lawns Conc. — 4%	G
Atrazine	Swiss Farms Prod.	Vigoro South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Syngenta Crop Prot.	Aatrex 4l Herb. — 42.6%	R
Atrazine	Syngenta Crop Prot.	Aatrex Nine-O — 88.2%	R
Atrazine	Syngenta Crop Prot.	Atrazine Tech. — 96%	G
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 41.9%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.6%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.9%	R
Atrazine	Tenkoz	Tenkoz Atrazine 90DF Herb. — 87.72%	R
Atrazine	Tenkoz	Tenkoz Atrazine 90DF Herb. — 88.2%	R
Atrazine	Universal Crop Prot. Alliance	Atrazine 4L — 42.12%	R
Atrazine	Universal Crop Prot. Alliance	Atrazine 4L Herb. — 42.6%	R
Atrazine	Universal Crop Prot. Alliance	Atrazine 90 — 85.5%	R
Atrazine	Universal Crop Prot. Alliance	Atrazine 90 DF Herb. — 88.2%	R
Atrazine	Voluntary Purch. Groups	Hi-Yield Atrazine Weed Killer — 4.08%	G
Atrazine	Winfield Solutions	Atrazine 4L — 42.12%	R
Atrazine	Winfield Solutions	Atrazine 90DF — 88%	R
Benefin	Dow AgroSciences (Dintec Agrichemicals)	Tech. Benefin — 96.6%	G
Benfluralin	Andersons Lawn Fert. Div.	Andersons Pro. Turf Prod. Crabgrass Prev. w/ 2.5% Balan Herb. (DG) — 2.5%	G
Bensulfuron-methyl	RiceCo	Londax — 60%	G
Bensulide	Gowan Co.	PrefarAgrosciencesrb. — 46%	G
Bensulide	PBIGordon Corp.	Bensumec 4LF — 46%	G
Bensulide	PBIGordon Corp.	Pre-San Granular 12.5G — 12.5%	G
Bensulide	PBIGordon Corp.	Pre-San Granular 7G — 7%	G
Bentazon, sodium salt	Arysta Lifescience	Basagran Herb. — 44%	G
Bentazon, sodium salt	Arysta Lifescience	Basagran Herb. — 44%	G
Bentazon, sodium salt	BASF Corp.	Basagran T/O Herb. — 44%	G
Bentazon, sodium salt	BASF Corp.	Basagran T&O Herb. — 44%	G
Bentazon, sodium salt	Winfield Solutions	Basagran — 44%	G
Bispyribac-sodium	Valent U.S.A. Corp.	Regiment Herb. — 80%	G
Bispyribac-sodium	Valent U.S.A. Corp.	Tradewind Herb. — 80%	G
Bispyribac-sodium	Valent U.S.A. Corp.	Velocity SG Herb. — 17.6%	G
Bromacil	Alligare	Bromacil 80 — 80%	G
Bromacil	Amrep	Misty Ex-It Emulsifiable Conc. — 2.3%	G
Bromacil	Atco International	Liberator 650 — 4%	G
Bromacil	Check-Mark	Opti-Kill — 3.3%	G
Bromacil	DuPont	DuPont Bromacil Tech. — 97.2%	G
Bromacil	DuPont	DuPont Hyvar X Herb. — 80%	G
Bromacil	DuPont	DuPont Hyvar X-L Herb. — 21.9%	G
Bromacil	Zep	Zep Conc. Weed Killer & Soil Sterilant — 1.52%	G
Bromacil	Zep	Zep formula 777 EC — 1.52%	G
Bromacil, lithium salt	Atco International	Blitz — 2.44%	G
Bromacil, lithium salt	Momarorporated	No Mow 7.5 — 7.5%	G
Bromacil, lithium salt	Momarorporated	No Mow II — 2.44%	G
Bromazil	Momarorporated	Weed Away — 4%	G
Butoxone	Albaugh	Butyrac 175 — 23%	G
Butoxone	Albaugh	Butyrac 200 — 25.9%	G
Butoxone	Winfield Solutions	2,4-DB 1.75 — 23%	G
Butoxone	Winfield Solutions	2,4-DB 200 — 25.9%	G
Carfentrazone-ethyl	FMC Corp.	Aim EC Herb. — 22.3%	G
Carfentrazone-ethyl	FMC Corp.	QuickSilver T&O Herb. — 21.3%	G
Chlorimuron-ethyl	Agsurf Corp.	Cemax Herb. — 25%	G
Chlorimuron-ethyl	DuPont	DuPont Classic Herb. — 25%	G

Common chemical name	Company	Trade names and formulations	Use classification
Chlorimuron-ethyl	Nufarm	Curio Herb. — 25%	G
Chlorothalonil	Regal Chem. Co.	Chlorostar DF — 82.5%	G
Chlorothalonil	Regal Chem. Co.	Chlorostar VI — 54%	G
Chlorsulfuron	Alligare	Alligare Chlorsulfuron 75 — 75%	G
Chlorsulfuron	DuPont	DuPont Telar XP Herb. — 75%	G
Clethodim	Albaugh	Clethodim 2E — 26.4%	G
Clethodim	Amtide	Clethodim 2EC — 26.4%	G
Clethodim	Arysta Lifescience	Clethodim 37% M.U.P. Herb. — 37%	G
Clethodim	Arysta Lifescience	Clethodim 37% MUP Herb. — 37%	G
Clethodim	Arysta Lifescience	Clethodim 70% M.U.P. Herb. — 70%	G
Clethodim	Arysta Lifescience	Shadow Herb. — 26.4%	G
Clethodim	Arysta Lifescience	Shadow Ultra Herb. — 12.9%	G
Clethodim	CropSmart	Crop$mart Clethodim — 26.4%	G
Clethodim	Helena Chem. Co.	HM-0714 — 12.6%	G
Clethodim	Helena Chem. Co.	Tapout — 12.6%	G
Clethodim	Loveland Prod.	Intensity One Post-Emergence Grass Herb. — 12.6%	G
Clethodim	Loveland Prod.	Intensity Post Emergence Grass Herb. — 26.4%	G
Clethodim	Makhteshim-Agan	Arrow 2 EC Herb. — 26.4%	G
Clethodim	Redeagle International	Clethodim 2E — 26.4%	G
Clethodim	Ritter Chem.	Cleo 26.4 — 26.4%	G
Clethodim	Rotam N. America	Dakota — 26.4%	G
Clethodim	Tacoma Ag	Clethodim 2EC — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tide International, USA	Tide Clethodim 2EC — 26.4%	G
Clethodim	Universal Crop Prot. Alliance	Clethodim — 26.4%	G
Clethodim	Universal Crop Prot. Alliance	Cropsmart Clethodim — 26.4%	G
Clethodim	Valent U.S.A. Corp.	Envoy Plus Herb. — 12.6%	G
Clethodim	Valent U.S.A. Corp.	Prism Herb. — 12.6%	G
Clethodim	Valent U.S.A. Corp.	Select 2 EC Herb. — 26.4%	G
Clethodim	Valent U.S.A. Corp.	Select 37% M.U.P. — 37%	G
Clethodim	Valent U.S.A. Corp.	Select 70% M.U.P. — 70%	G
Clethodim	Valent U.S.A. Corp.	Select Max Herb. w/ Inside Tech. — 12.6%	G
Clethodim	Willowood	Willowood Clethodim 2EC — 26.4%	G
Clethodim	Winfield Solutions	Section 2EC — 26.4%	G
Clethodim	Winfield Solutions	Section 2EC — 73.6%	G
Clodinafop-propargyl	Arysta Lifescience	NextStep NG — 6.4%	G
Clodinafop-propargyl	Syngenta Crop Prot.	Discover NG — 6.4%	G
Clomazone	FMC Corp.	Command 3ME Microencapsuled Herb. — 31.1%	G
Clomazone	Helena Chem. Co.	Command 3 ME — 31.4%	G
Clopyralid	Alligare	Alligare Clopyralid 3 — 40.9%	G
Clopyralid	Dow Agrosciences	Lontrel Turf and Orn. — 40.9%	G
Clopyralid	Dow Agrosciences	Stinger — 40.9%	G
Clopyralid	Dow Agrosciences	Transline — 40.9%	G
Clopyralid	Lawn and Garden Prod.	Kudzu Killer — 40.9%	G
Clopyralid	Lawn and Garden Prod.	Thistledown — 40.9%	G
Clopyralid	Nufarm Americas	Clean Slate Sel. Herb. — 40.9%	G
Cloransulam-methyl	Dow Agrosciences	FirstRate — 84%	G
Copper	Applied Biochemists	Harpoon Aq. Herb. — 23%	G
Copper	Applied Biochemists	Harpoon Granular Aq. Herb. — 9.87%	G
Copper as elemental	Applied Biochemists	Clearigate — 3.83%	G
Copper as elemental	Applied Biochemists	Cutrine-Plus — 9%	G
Copper as elemental	PBIGordon Corp.	Gordon's PondMaster Aq. Herb. — 8%	G
Copper as elemental	Sepro Corp.	Komeen — 8%	G
Copper carbonate	Sepro Corp.	Captain — 15.9%	G
Copper carbonate	Sepro Corp.	Captain XTR — 15.9%	G
Copper oxychloride	Beaver Plastics	COPPERBLOCK — 11.7%	G
Copper sulfate	Check-Mark	Root Free II — 99%	G
Copper sulfate	Helena Chem. Co.	COPPER-Z 4/4 — 10%	G
Copper sulfate	PBIGordon Corp.	Gordon's PondMaster Copper Sulfate Crystals — 99%	G
Copper sulfate	Roebic Laboratories	K-77 Root Killer — 99%	G

Common chemical name	Company	Trade names and formulations	Use classification
Copper sulfate	Roto-Rooter Corp.	Roto-Rooter Root Destroyer — 99%	G
Copper sulfate	Sanco Industries	Root Destroyer — 99%	G
Copper sulfate	Scotch Corp.	Instant Power Sewer Line Root Destroyer — 99%	G
Copper sulfate	The Pond Guy	Pondweed Defense — 31.27%	G
Copper sulfate	Voluntary Purch. Groups	Hi-Yield Root Killer — 99%	G
Copper sulfate	Zep	Drain Care Root Kill — 99%	G
Copper sulfate	Zep	Zep Root Kill — 99%	G
Corn gluten meal	Woodstream Corp.	Concern Weed Prevention Plus — 100%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher EZ — 18.2%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher SF — 29.6%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher Tech. — 96.5%	G
d-Limonene	Cutting Edge Formulations	Avenger Weed Killer Conc. — 70%	G
d-Limonene	Cutting Edge Formulations	Avenger Weed Killer RTU — 17.5%	G
d-Limonene	Lilly Miller Brands	Conc. WorryFree Brand Weed & Grass Killer — 70%	G
d-Limonene	Lilly Miller Brands	WorryFree Brand Weed & Grass Killer — 17.5%	G
DCPA	Amvac Chem. Corp.	Dacthal Flowable Herb. — 54.9%	G
DCPA	Amvac Chem. Corp.	Dacthal W-75 Herb. — 75%	G
Dicamba	Albaugh	Dicamba DMA — 48.2%	G
Dicamba	Albaugh	Dicamba HD — 56.8%	G
Dicamba	Alligare	Cruise Cont. — 48.2%	G
Dicamba	Arysta Lifescience	Banvel — 49.4%	G
Dicamba	BASF Corp.	Clarity Herb. — 58.1%	G
Dicamba	Direct Ag Source	Dicamba Max 4 — 49.2%	G
Dicamba	Gharda Chem.	Oracle Dicamba Ag. Herb. — 49.77%	G
Dicamba	Helena Chem. Co.	Vision — 40%	G
Dicamba	Loveland Prod.	Rifle Herb. — 48.2%	G
Dicamba	Loveland Prod.	Strut Herb. — 56.8%	G
Dicamba	Nufarm Americas	Clash Sel. Herb. — 56.8%	G
Dicamba	Nufarm Americas	Diablo — 48.2%	G
Dicamba	Nufarm Americas	Riverdale Vanquish Herb. — 56.8%	G
Dicamba	Tacoma Ag	Dicamba 4 DMA — 50.2%	G
Dicamba	Tenkoz	Detonate Herb. — 58.1%	G
Dicamba	Universal Crop Prot. Alliance	Dicamba — 48.2%	G
Dicamba	Winfield Solutions	Sterling Blue — 58.1%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Casoron Granules — 2%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Noxall Granules — 2%	G
Dichlobenil	Ambrands	Image Herb. Year-Long Veg. Killer — 2%	G
Dichlobenil	Chemtura Corp.	Casoron 4G — 4%	G
Dichlobenil	Chemtura Corp.	Casoron CS — 15.3%	G
Dichlobenil	General Chem. Co./ Gelco Supply	RootX — 0.55%	G
Dichlobenil	Haviland Consumer Prod.	Blast It — 4%	G
Dichlobenil	Haviland Consumer Prod.	ProTeam ZapZit — 4%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Casoron Granules — 2%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Granular Noxall Veg. Killer — 2%	G
Dichlobenil	PBIGordon Corp.	Barrier Orn. Landscaping Herb. — 4%	G
Dichlobenil	Roebic Laboratories	Foaming Root Killer — 0.55%	G
Diclofop-methyl	Bayer Env. Science	Illoxan 3 EC Herb. — 34.7%	R
Diclosulam	Dow Agrosciences	Strongarm — 84%	G
Dimethenamide-P	BASF Corp.	Outlook Herb. — 63.9%	G
Dimethenamide-P	BASF Corp.	Tower Herb. — 63.9%	G
Dimethenamide-P	Helena Chem. Co.	Sortie — 63.9%	G
Dimethenamide-P	Loveland Prod.	Slider — 63.9%	G
Dipotassium endothall	United Phosphorus	Cascade — 40.3%	G
Diquat dibromide	Aceto Ag. Chem. Corp.	Aceto Diquat 2L AG Herb. — 37.3%	G
Diquat dibromide	Aceto Ag. Chem. Corp.	Aceto Diquat 2L Landscape & Aq. Herb. — 37.3%	G
Diquat dibromide	Aero Chem. Co.	Sudden Death — 1.85%	G
Diquat dibromide	Alligare	Alligare Diquat Herb. — 37.3%	G
Diquat dibromide	Amrep	Misty Weedtrol CF — 4.35%	G
Diquat dibromide	Amrep	Misty Weedtrol VF — 1.85%	G
Diquat dibromide	Applied Biochemists	Harvester Landscape & Aq. Herb. — 37.3%	G
Diquat dibromide	Applied Biochemists	Weedtrine D Aq. Herb. — 8.53%	G

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Diquat dibromide	Atco International	Liberator 711 — 1.85%	G
Diquat dibromide	Momarorporated	Edger — 1.85%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat 2L Herb. — 37.3%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat SPC 2L Landscape & Aq. Herb. — 37.3%	G
Diquat dibromide	Rotam N. America	Rowrunner AG — 37.3%	G
Diquat dibromide	Rotam N. America	Rowrunner ATO — 37.3%	G
Diquat dibromide	Sanco Industries	Tsunami DQ — 37.3%	G
Diquat dibromide	Sepro Corp.	Littora — 37.3%	G
Diquat dibromide	Sewer Sciences	Razorooter II — 37.3%	G
Diquat dibromide	Sharda USA	Diquash Ag Desiccant & Herb. — 37.3%	G
Diquat dibromide	Sharda USA	Diquash Landscape & Aq. Herb. — 37.3%	G
Diquat dibromide	Solera ATO	Diquat Landscape and Aq. Herb. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Reward Landscape and Aq. Herb. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Reward Manufacturing Conc. — 37.3%	G
Diquat dibromide	Syngenta Crop Prot.	Tribune Herb. — 37.3%	G
Diquat dibromide	Total Solutions	Eliminator — 1.85%	G
Dithiopyr	Agrium Advanced Tech.	Dimension 0.1% + Fert. Turf and Orn. Herb. — 0.1%	G
Dithiopyr	Agrium Advanced Tech.	Dimension 0.125% Plus Fert. Turf and Orn. Herb. 32-0-8 — 0.13%	G
Dithiopyr	Agrium Advanced Tech.	Dimension 0.125% Plus Fert. Turf and Orn. Herb. 37-0-5 — 0.13%	G
Dithiopyr	Alligare	Alligare Dithiopyr 40 — 40%	G
Dithiopyr	Bonide Prod.	Bonide DuraTurf Crabgrass & Weed Prev. for Lawns & Orn. Beds — 0.27%	G
Dithiopyr	Dow Agrosciences	Dimension 2EW — 24%	G
Dithiopyr	Dow Agrosciences	Dimension EC — 12.7%	G
Dithiopyr	Dow Agrosciences	Dimension Ultra 40WP — 40%	G
Dithiopyr	Farmsaver.com	Quali-Pro Dithiopyr 40 WSB — 40%	G
Dithiopyr	Infinity Fert.	Sta-Green Crab Ex — 0.25%	G
Dithiopyr	Lebanon Seaboard Corp.	Preen Lawn Crabgrass Cont. — 0.19%	G
Dithiopyr	Lebanon Seaboard Corp.	Preen Lawn Crabgrass Prev. — 0.13%	G
Dithiopyr	Lebanon Seaboard Corp.	Preen South. Weed Prev. — 0.27%	G
Dithiopyr	Lebanon Seaboard Corp.	Preen South. Weed Prev. + Plant Food — 0.19%	G
Dithiopyr	Makhteshim-Agan	Quali-Pro Dithiopyr 40 WSB — 40%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Crabgrass & Weed Prev. — 0.17%	G
Dithiopyr	Voluntary Purch. Groups	Hi-Yield Orn. Weed Prev. — 0.13%	G
Dithiopyr	Voluntary Purch. Groups	Hi-Yield Turf & Orn. Weed & Grass Stopper — 0.13%	G
Diuron	Alligare	Alligare Diuron 4L — 40.7%	G
Diuron	Alligare	Alligare Diuron 80 DF — 80%	G
Diuron	Direct Ag Source	Cleanshot DF — 80%	G
Diuron	Drexel Chem. Co.	Drexel Diuron 4L — 40%	G
Diuron	Drexel Chem. Co.	Drexel Diuron 80 Herb. — 80%	G
Diuron	DuPont	DuPont Direx 4L Herb. — 40.9%	G
Diuron	DuPont	DuPont Diuron Tech. — 98.4%	G
Diuron	DuPont	DuPont Karmex DF Herb. — 80%	G
Diuron	DuPont	DuPont Karmex IWC Herb. — 80%	G
Diuron	DuPont	DuPont Karmex XP Herb. — 80%	G
Diuron	Loveland Prod.	Diuron 4L Herb. — 40%	G
Diuron	Loveland Prod.	Diuron 80 WDG Weed Killer — 80%	G
Diuron	Makhteshim-Agan	Cleanshot 4L — 40.7%	G
Diuron	Makhteshim-Agan	Determine 4L — 40.7%	G
Diuron	Makhteshim-Agan	Direx 4L — 40.7%	G
Diuron	Makhteshim-Agan	Diuron 4L — 40.7%	G
Diuron	Makhteshim-Agan	Diuron 80 DF — 80%	G
Diuron	Makhteshim-Agan	Karmex 80DF — 80%	G
Diuron	Makhteshim-Agan	Parrot 4L — 40.7%	G
Diuron	Makhteshim-Agan	Parrot DF — 80%	G
Diuron	Makhteshim-Agan	SEKOR 4L — 40.7%	G
Diuron	Makhteshim-Agan	Super Di 4L — 40.7%	G
Diuron	Willowood	Willowood Diuron 4SC — 40.7%	G
Diuron	Winfield Solutions	Diuron 4L — 40%	G
Diuron	Winfield Solutions	Diuron 80DF — 80%	G
Endothall	United Phosphorus	Aquathol K — 40.3%	G
Endothall	United Phosphorus	Aquathol Super K — 63%	G

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Endothall	United Phosphorus	Hydrothol 191 Aq. — 53%	G
Endothall	United Phosphorus	Hydrothol Granular — 11.2%	G
EPTC	Gowan Co.	Eptam 7E — 87.8%	G
Ethalfluralin	Dow Agrosciences	Sonalan HFP — 35.4%	G
Ethalfluralin	Dow Agrosciences (Dintec Agrichemicals)	Tech. Ethalfluralin — 96%	G
Ethalfluralin	Loveland Prod.	Curbit EC Herb. — 35.4%	G
Ethephon	Makhteshim-Agan	Ethephon 2SL — 21.7%	G
Ethephon	Redeagle International	Ethephon 6 — 54%	G
Ethofumesate	Bayer Env. Science	Prograss Herb. — 19%	G
Ethofumesate	Bayer Env. Science	Prograss SC Herb. — 42%	G
Ethofumesate	United Phosphorus	PoaConstrictor — 42%	G
Fenoxaprop-ethyl	Bayer Env. Science	Acclaim Extra Herb. — 6.59%	G
Fenoxaprop-p-ethyl	Bayer Advanced	Bayer Advanced Bermudagrass Cont. for Lawns RTS— 0.41%	G
Fenoxaprop-p-ethyl	Bayer Advanced	Bayer Advanced Crabgrass Killer for Lawns RTS— 0.41%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	RiceStar Herb. — 6.7%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	RiceStar HT Herb. — 6.7%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	Whip 360 Herb. — 6.59%	G
Fenpyroximate	Sepro Corp.	Akari 5SC — 5%	G
Flazasulfuron	PBIGordon Corp.	Katana Turf Herb. — 25%	G
Florasulam	Dow Agrosciences	Defendor — 4.84%	G
Florasulam	Dow Agrosciences	EF-1343 — 4.84%	G
Florasulam	Dow Agrosciences	Florasulam Wet Cake Tech. — 99.2%	G
Fluazifop-butyl	Ortho Group	Ortho Grass B Gon Garden Grass Killer — 0.48%	G
Fluazifop-P-butyl	Ortho Group	Ortho Grass B Gon Grass Killer for Landscapes RTU — 0.48%	G
Fluazifop-P-butyl	PBIGordon Corp.	Ornamec 170 Grass Herb. — 1.7%	G
Fluazifop-P-butyl	PBIGordon Corp.	Ornamec Over-the-Top Grass Herb. — 6.75%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fluazifop-P-Butyl Tech. — 93%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fusilade DX — 24.5%	G
Fluazifop-P-butyl	Syngenta Crop Prot.	Fusilade II Turf & Orn. Herb. — 24.5%	G
Flucarbazone-sodium	Arysta Lifescience	Align Herb. — 70%	G
Flucarbazone-sodium	Arysta Lifescience	Everest 70% Water Dispersible Granular Herb. — 70%	G
Flucarbazone-sodium	Syngenta Crop Prot.	Sierra — 35%	G
Fludioxonil	Syngenta Crop Prot.	Maxim PSP — 0.5%	G
Flufenacet	Bayer Cropscience	Define SC Herb. — 41%	G
Flumetsulam	Dow Agrosciences	Python WDG — 80%	G
Flumiclorac pentyl ester	Valent U.S.A. Corp.	Resource Herb. — 10.1%	G
Flumioxazin	Valent U.S.A. Corp.	BroadStar Herb. — 0.25%	G
Flumioxazin	Valent U.S.A. Corp.	Chateau Herb. SW — 51%	G
Flumioxazin	Valent U.S.A. Corp.	Chateau Herb. WDG — 51%	G
Flumioxazin	Valent U.S.A. Corp.	Clipper Herb. — 51%	G
Flumioxazin	Valent U.S.A. Corp.	Gangster Herb. — 51%	G
Flumioxazin	Valent U.S.A. Corp.	Payload Herb. — 51%	G
Flumioxazin	Valent U.S.A. Corp.	SureGuard Herb. — 51%	G
Flumioxazin	Valent U.S.A. Corp.	Valor SX Herb. — 51%	G
Fluometuron	Arysta Lifescience	Flo-Met 4L — 41.7%	G
Fluometuron	Makhteshim-Agan	Cotoran 4L — 41.7%	G
Fluridone	Alligare	Alligare Fluridone — 41.7%	G
Fluridone	Alligare	Alligare Fluridone Granule — 5%	G
Fluridone	Alligare	Alligare Fluridone RTU — 3.79%	G
Fluridone	Applied Biochemists	Restore S.M.A.R.T Sel. Mgmt. AQ Restoration Tool Aq. Herb. — 41.7%	G
Fluridone	Sepro Corp.	Avast ! SC — 41.7%	G
Fluridone	Sepro Corp.	Sonar A.S. — 41.7%	G
Fluridone	Sepro Corp.	Sonar Genesis — 6.3%	G
Fluridone	Sepro Corp.	Sonar PR — 5%	G
Fluridone	Sepro Corp.	Sonar Q — 5%	G
Fluridone	Sepro Corp.	Sonar RTU — 3.79%	G
Fluridone	Sepro Corp.	Sonar SRP — 5%	G
Fluridone	Sepro Corp.	SonarOne — 5%	G
Fluridone	Tessenderlo Kerley	WhiteCap — 41.7%	G
Fluroxypyr	Alligare	Fluroxypyr — 45.5%	G
Fluroxypyr	Dow Agrosciences	Vista — 26.2%	G

Common chemical name	Company	Trade names and formulations	Use classification
Fluroxypyr	Dow Agrosciences	Vista XRT — 45.52%	G
Fluthiacet-methyl	FMC Corp.	Cadet Herb. — 10.3%	G
Fomesafen	Cheminova	Dawn Herb. — 22.8%	G
Fomesafen	Cheminova	Rhythm Herb. — 22.1%	G
Fomesafen	Loveland Prod.	Top Gun Herb. — 22.8%	G
Fomesafen	Rotam N. America	Andros 2.0 Herb. — 22.8%	G
Fomesafen	Sharda USA	Shafen Herb. — 22.8%	G
Fomesafen	Sharda USA	Shafen Star — 22.1%	G
Fomesafen	Solera ATO	Fomesafen 1.88 Herb. — 22.1%	G
Fomesafen	Syngenta Crop Prot.	Flexstar — 22.1%	G
Fomesafen	Syngenta Crop Prot.	Fomesafen Tech. — 98%	G
Fomesafen	Syngenta Crop Prot.	Reflex Herb. — 22.8%	G
Fomesafen	Syngenta Crop Prot.	Ringside — 22.8%	G
Fomesafen	Syngenta Crop Prot.	Sedona — 22.1%	G
Fomesafen	Willowood	Willowood Fomesafen 1.88SL — 22.1%	G
Fomesafen	Willowood	Willowood Fomesafen 2SL — 22.8%	G
Fomesafen Sodium	Albaugh	Battle Star — 22.1%	G
Fomesafen Sodium	Solera ATO	Fomesafen 2 SL Herb. — 22.8%	G
Foramsulfuron	Bayer Env. Science	Revolver Herb. — 2.34%	G
Fosamine ammonium	DuPont	DuPont Krenite S Brush Cont. Agent — 41.5%	G
Glufosinate	Bayer Advanced	Bayer Adv. Garden Powerforce Grass & Weed Killer II Super Conc. — 11.33%	G
Glufosinate	Bayer Cropscience	Ignite — 24.5%	G
Glufosinate	Bayer Cropscience	Ignite 280 SL — 24.5%	G
Glufosinate	Bayer Cropscience	Liberty 280 SL Herb. — 24.5%	G
Glufosinate	Bayer Cropscience	Rely 200 Herb. — 18.19%	G
Glufosinate	Bayer Cropscience	Rely 280 — 24.5%	G
Glufosinate	Bayer Cropscience	Remove Herb. — 18.19%	G
Glufosinate	Bayer Env. Science	Finale Herb. — 11.33%	G
Glufosinate	Solera ATO	Glufos 280SL Herb. — 24.5%	G
Glyphosate	Aceto Ag. Chem. Corp.	Glyfine 5 Plus Herb. — 53.8%	G
Glyphosate	Aceto Ag. Chem. Corp.	Glyfine Plus Herb. — 41%	G
Glyphosate	Aceto Ag. Chem. Corp.	Glyphosate Tech. — 98.1%	G
Glyphosate	Aero Chem. Co.	Round One — 18%	G
Glyphosate	AgSaver	AgSaver Glyphosate 41% Plus — 41%	G
Glyphosate	Albaugh	Aqua Star — 53.8%	G
Glyphosate	Albaugh	Gly Star Gold — 41%	G
Glyphosate	Albaugh	Gly Star Original — 41%	G
Glyphosate	Albaugh	Gly Star Plus — 41%	G
Glyphosate	Albaugh	Gly Star Pro — 41%	G
Glyphosate	Alligare	Alligare Glyphosate 4 — 41%	G
Glyphosate	Alligare	Glyphosate 4 Plus — 41%	G
Glyphosate	Alligare	Glyphosate 5.4 — 53.8%	G
Glyphosate	Amrep	Misty Glypho Kill 18 — 18%	G
Glyphosate	Amrep	Misty Glypho Kill 2 — 2%	G
Glyphosate	Applied Biochemists	Shore-Klear Aq. Herb. — 53.8%	G
Glyphosate	Applied Biochemists	ShoreKlear-Plus Aq. Herb. — 18%	G
Glyphosate	Arcana	Glycana Plus 41 — 41%	G
Glyphosate	Bonide Prod.	Bonide KleenUp Weed & Grass Killer 41% Super Conc. — 41%	G
Glyphosate	Bonide Prod.	Bonide KleenUp Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Check-Mark	Trailblazer MAXX — 53.8%	G
Glyphosate	Cheminova	Glyfos — 41%	G
Glyphosate	Cheminova	Glyfos Aq. — 53.8%	G
Glyphosate	Cheminova	Glyfos MUC 62% — 62%	G
Glyphosate	Cheminova	Glyfos Pro Herb. — 41%	G
Glyphosate	Cheminova	Glyfos X-TRA — 41%	G
Glyphosate	Cheminova	Glyphosate Conc. — 62.5%	G
Glyphosate	Chemsico	Ace Conc. Weed & Grass Killer — 25%	G
Glyphosate	Chemsico	Ace RTU Weed & Grass Killer 2 — 1.92%	G
Glyphosate	Chemsico	Eliminator Weed & Grass Killer Conc. — 41%	G
Glyphosate	Chemsico	Eliminator Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer — 1.92%	G

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Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer Conc. — 41%	G
Glyphosate	Chemsico	Ultra-Kill Weed & Grass Killer Conc. 2 — 25%	G
Glyphosate	Consus Chem.	Consus Glyphosate 41% — 41%	G
Glyphosate	Consus Chem.	Consus Glyphosate 62% MUP — 62%	G
Glyphosate	Cont. Solutions	Eraser — 41%	G
Glyphosate	Cont. Solutions	Eraser AQ — 53.8%	G
Glyphosate	CropSmart	CropSmart Glyphosate 41 Plus — 41%	G
Glyphosate	Dow Agrosciences	Accord Conc. — 53.8%	G
Glyphosate	Dow Agrosciences	Accord XRT II — 50.2%	G
Glyphosate	Dow Agrosciences	Duramax — 50.2%	G
Glyphosate	Dow Agrosciences	Durango DMA — 50.2%	G
Glyphosate	Dow Agrosciences	Glyphomax XRT — 53.6%	G
Glyphosate	Dow Agrosciences	Glyphosate 62% Tech. Solution — 62%	G
Glyphosate	Dow Agrosciences	Glyphosate Tech. — 76%	G
Glyphosate	Dow Agrosciences	Glyphosate Tech. XG — 96.2%	G
Glyphosate	Dow Agrosciences	Glypro Plus — 41%	G
Glyphosate	Dow Agrosciences	RapidFire — 50.2%	G
Glyphosate	Dow Agrosciences	Rodeo — 53.8%	G
Glyphosate	Drexel Chem. Co.	Drexel Imitator + Weed & Grass Killer — 41%	G
Glyphosate	Drexel Chem. Co.	Drexel Imitator Aq. Herb. — 53.8%	G
Glyphosate	Drexel Chem. Co.	Drexel Imitator Plus — 41%	G
Glyphosate	Drexel Chem. Co.	Drexel Imitator RTU — 2%	G
Glyphosate	Ez-ject	EZ-Ject Diamondback Herb. Shells — 83.5%	G
Glyphosate	Farmsaver.com	Quali-Pro Glyphosate T&O — 41%	G
Glyphosate	Farmway	Farmway Glyphosate 62% Manufacturing Conc. — 62%	G
Glyphosate	Farmway	Farmway-Max Glyphosate 41% — 41%	G
Glyphosate	Fuzion Tech.	Z-Glyphosate 41 Max — 41%	G
Glyphosate	Glysortia	Glysort — 41%	G
Glyphosate	Glysortia	Glysort Plus — 41%	G
Glyphosate	Gro Tec	Eliminator Weed & Grass Killer II RTU — 1.92%	G
Glyphosate	Gro Tec	Eliminator Weed & Grass Killer Super Conc. — 41%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer Super Conc. — 41%	G
Glyphosate	Helena Chem. Co.	Hoss Ultra — 41%	G
Glyphosate	Helm Agro	Glyphosate 97% TGAI — 97%	G
Glyphosate	Helm Agro	Helosate 75 SG Herb. — 75.7%	G
Glyphosate	Helm Agro	Helosate Plus Advanced — 41%	G
Glyphosate	Jimmy Sanders	Third Degree Prem. Glyphosate — 41%	G
Glyphosate	Lawn and Garden Prod.	Remuda Full Strength — 41%	G
Glyphosate	Lesco	Lesco Prosecutor Pro Non-Sel. Herb. — 41%	G
Glyphosate	Libertas Now	Strikeout Extra — 41%	G
Glyphosate	Libertas Now	Strikeout Loaded — 41%	G
Glyphosate	Loveland Prod.	Cinco — 53.8%	G
Glyphosate	Loveland Prod.	Four Power Plus — 41%	G
Glyphosate	Loveland Prod.	Kleenup-Pro — 41%	G
Glyphosate	Loveland Prod.	Mad Dog — 41%	G
Glyphosate	Loveland Prod.	Mad Dog Plus — 41%	G
Glyphosate	Loveland Prod.	Makaze — 41%	G
Glyphosate	Maid Brands	Do it Best Grass & Weed Killer Conc. — 18%	G
Glyphosate	Maid Brands	Do it Best Grass & Weed Killer RTU — 2%	G
Glyphosate	Maid Brands	Heavy Weight Grass & Weed Killer — 2%	G
Glyphosate	Makhteshim-Agan	Glyphogan — 41%	G
Glyphosate	Makhteshim-Agan	Glyphogan Plus — 41%	G
Glyphosate	Makhteshim-Agan	Quali-Pro Glyphosate Plus — 41%	G
Glyphosate	Makhteshim-Agan	Quali-Pro Glyphosate T&O — 41%	G
Glyphosate	Monsanto Co.	AquaMaster Herb. — 53.8%	G
Glyphosate	Monsanto Co.	Exchange Herb. — 41%	G
Glyphosate	Monsanto Co.	Glyphosate Tech. (Wetcake) — 85%	G
Glyphosate	Monsanto Co.	Honcho Herb. — 41%	G
Glyphosate	Monsanto Co.	Honcho Plus Herb. — 41%	G
Glyphosate	Monsanto Co.	IP410 Herb. — 41%	G
Glyphosate	Monsanto Co.	IP410-A Herb. — 41%	G

Common chemical name	Company	Trade names and formulations	Use classification
Glyphosate	Monsanto Co.	IP410FC Herb. — 41%	G
Glyphosate	Monsanto Co.	K487 Herb. — 48.7%	G
Glyphosate	Monsanto Co.	MON 0139 62% Tech. Solution — 62%	G
Glyphosate	Monsanto Co.	MON 8750 Herb. — 95.2%	G
Glyphosate	Monsanto Co.	Ranger PRO Herb. — 41%	G
Glyphosate	Monsanto Co.	Roundup Custom for Aq. and Terrestrial Use — 53.8%	G
Glyphosate	Monsanto Co.	Roundup PowerMAX Herb. — 48.7%	G
Glyphosate	Monsanto Co.	Roundup PRO Conc. Herb. — 50.2%	G
Glyphosate	Monsanto Co.	Roundup PRO Herb. — 41%	G
Glyphosate	Monsanto Co.	Roundup ProDry Herb. — 71.4%	G
Glyphosate	Monsanto Co.	Roundup ProMax Herb. — 48.7%	G
Glyphosate	Monsanto Co.	Roundup UltraDRY Herb. — 71.4%	G
Glyphosate	Monsanto Co.	Roundup WeatherMAX Herb. — 48.8%	G
Glyphosate	Monsanto Co.	Roundup Weed & Grass Killer Conc. — 25%	G
Glyphosate	Monsanto Co.	Roundup Weed & Grass Killer RTU — 2%	G
Glyphosate	Monsanto Co.	Roundup Weed & Grass Killer Super Conc. — 50.2%	G
Glyphosate	Newagco	NewAgco Glyphosate Fully Loaded 41 Plus — 41%	G
Glyphosate	Northmoose Chem.	Lajj Plus — 41%	G
Glyphosate	Nufarm	Abundit Extra Herb. — 41%	G
Glyphosate	Nufarm	Credit 41 EXTRA Non-Sel. Herb. — 41%	G
Glyphosate	Nufarm	Credit 41 Non-Sel. Herb. — 41%	G
Glyphosate	Nufarm	Extra Credit 5 Systemic Herb. — 50.6%	G
Glyphosate	Nufarm Americas	AquaNeat Aq. Herb. — 53.8%	G
Glyphosate	Nufarm Americas	Foresters' Non-Sel. Herb. — 53.8%	G
Glyphosate	Nufarm Americas	Primera Razor Pro Herb. — 41%	G
Glyphosate	Nufarm Americas	Razor Herb. — 41%	G
Glyphosate	Nufarm Americas	Razor PRO Herb. — 41%	G
Glyphosate	Ortho Group	Basic Solutions Liquid Edger RTU — 0.75%	G
Glyphosate	Ortho Group	Basic Solutions Weed & Grass Killer Conc. — 18%	G
Glyphosate	Ortho Group	Basic Solutions Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Ortho Group	Total Kill Brand Pro Weed & Grass Killer Herb. II — 41%	G
Glyphosate	Ortho Group	Total Kill Weed & Grass Killer RTU — 0.96%	G
Glyphosate	Ortho Group	Total Kill Weed & Grass Killer Super Conc. — 41%	G
Glyphosate	PBIGordon Corp.	GlyphoMate 41 Weed & Grass Killer + Aq. Herb. — 41%	G
Glyphosate	PBIGordon Corp.	Gordon's Liquid Edger 2 — 1%	G
Glyphosate	PBIGordon Corp.	Gordon's PondMaster Surface & Shoreline Herb. — 18%	G
Glyphosate	PBIGordon Corp.	Gordon's Pronto Big N' Tuf — 41%	G
Glyphosate	PBIGordon Corp.	Gordon's Pronto Fast Acting Brush Killer — 32.3%	G
Glyphosate	PBIGordon Corp.	Gordon's Pronto Fast Acting Weed & Grass Killer — 2%	G
Glyphosate	PBIGordon Corp.	Gordon's Pronto Fast Acting Weed & Grass Killer Conc. — 25%	G
Glyphosate	PBIGordon Corp.	Gordon's Stump Killer RTU — 32.3%	G
Glyphosate	PBIGordon Corp.	GroundWork Conc. 25% Weed & Grass Killer — 25%	G
Glyphosate	PBIGordon Corp.	GroundWork Conc. 50% Super Weed & Grass Killer — 50%	G
Glyphosate	PBIGordon Corp.	GroundWork RTU 2% Weed & Grass Killer — 2%	G
Glyphosate	Pro Chem	Dead Zone — 18%	G
Glyphosate	Prokoz	Prokoz Glyphosate Pro 4 Herb. — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save 41% Glyphosate Plus Conc. w/ Surfactant — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save Conc. Grass & Weed Killer 41% Glyphosate — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save Grass & Weed Killer 41% Glyphosate Plus — 41%	G
Glyphosate	Ragan and Massey	FarmWorks 41% Glyphosate Plus Conc. w/ Surfactant Grass & Weed Killer — 41%	G
Glyphosate	Repar Corp	Top Dog Glycel 41% Plus — 41%	G
Glyphosate	Ritter Chem.	Alecto 41 HL — 41%	G
Glyphosate	Ritter Chem.	Alecto 41S — 41%	G
Glyphosate	Ritter Chem.	Alecto UL — 41%	G
Glyphosate	Sanco Industries	Catt Plex Cattail Cont. — 53.8%	G
Glyphosate	Sepro Corp.	AquaPro — 53.8%	G
Glyphosate	Sharda USA	Shar-Max Glyphosate 41% SL — 41%	G
Glyphosate	South. Ag. Insecticides	Weed Pro — 41%	G
Glyphosate	Swiss Farms Prod.	Kgro Grass & Weed Killer 1 RTU — 1.92%	G
Glyphosate	Swiss Farms Prod.	Kgro Grass & Weed Killer Conc. — 16.5%	G
Glyphosate	Syngenta Crop Prot.	Departure Herb. — 36.5%	G

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Glyphosate	Syngenta Crop Prot.	Lesco Prosecutor Professional Max — 36.5%	G
Glyphosate	Syngenta Crop Prot.	Refuge Herb. — 52.3%	G
Glyphosate	Syngenta Crop Prot.	Touchdown Total — 36.5%	G
Glyphosate	Syngenta Crop Prot.	Traxion — 36.5%	G
Glyphosate	Tacoma Ag	Glyphosate Plus — 41%	G
Glyphosate	Tenkoz	Buccaneer Glyphosate Herb. — 41%	G
Glyphosate	Tenkoz	Buccaneer Plus Glyphosate Herb. — 41%	G
Glyphosate	Total Solutions	Zap-It — 0.96%	G
Glyphosate	United Phosphorus	Glypho 41 Herb. — 41%	G
Glyphosate	Universal Crop Prot. Alliance	Crop-Sure Glyphosate 41 Plus — 41%	G
Glyphosate	Universal Crop Prot. Alliance	Gly-4 Plus — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Killzall Aq. Herb. — 53.8%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Killzall II Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall II — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall II — 41%	G
Glyphosate	Voluntary Purch. Groups	Hi-Yield Super Conc. Killzall Weed & Grass Killer — 41%	G
Glyphosate	Winfield Solutions	Cornerstone 5 Plus — 53.8%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Rascal Plus — 41%	G
Glyphosate	Winfield Solutions	Rascal Plus — 41%	G
Glyphosate	Zep	Enforcer Brush Killer Conc. — 27%	G
Glyphosate	Zep	Enforcer Roots & All Ult. Grass & Weed Killer Conc. w/ 27% Glyphosate — 27%	G
Glyphosate	Zep	Enforcer Roots & All Ult. Grass & Weed Killer RTU w/ 1.92% Glyphosate — 1.92%	G
Glyphosate	Zep	Enforcer Roots & All Ult. Grass & Weed Killer Super Conc. w/ 41% Glyphosate — 41%	G
Glyphosate	Zep	Zep Non-Sel. Weed Killer Conc. — 27%	G
Glyphosate	Zep	Zep Weed Defeat II — 27%	G
Halosulfuron-methyl	Aceto Ag. Chem. Corp.	Halomax 75 Herb. — 75%	G
Halosulfuron-methyl	Aceto Ag. Chem. Corp.	Profine 75 Herb. — 75%	G
Halosulfuron-methyl	Gowan Co.	Permit Herb. — 75%	G
Halosulfuron-methyl	Gowan Co.	Sandea Herb. — 75%	G
Halosulfuron-methyl	Gowan Co.	Sedgehammer Turf Herb. — 75%	G
Halosulfuron-methyl	Gowan Co.	SedgehammerPlus Herb. — 5%	G
Halosulfuron-methyl	Lawn and Garden Prod.	Nutgrass Killer II Sel. Herb. — 75%	G
Halosulfuron-methyl	Nufarm Americas	Nufarm Prosedge Sel. Herb. — 75%	G
Halosulfuron-methyl	Nufarm Americas	Nufarm Prosedge Sel. Herb.2 — 75%	G
Halosulfuron-methyl	Voluntary Purch. Groups	Hi-Yield Nutsedge Cont. — 75%	G
Halosulfuron-methyl	Winfield Solutions	Herbivore Herb. — 75%	G
Herbicidal soap	Safer	Safer Brand Fast Acting Weed and Grass Killer — 3%	G
Herbicidal soap	Safer	SureFire Fast Acting Weed & Grass Killer — 3%	G
Hexazinone	DuPont	DuPont Hexazinone Tech. — 98.7%	G
Hexazinone	DuPont	DuPont Velpar DF Herb. — 75%	G
Hexazinone	DuPont	DuPont Velpar L Herb. — 25%	G
Hexazinone	DuPont	DuPont Velpar ULW Herb. — 75%	G
Hexazinone	Helena Chem. Co.	Velossa — 25%	G
Hexazinone	Pro Serve	Pronone Power Pellet — 75%	G
Imazamox	BASF Corp.	Beyond Herb. — 12.1%	G
Imazamox	BASF Corp.	Clearcast Herb. — 12.1%	G
Imazamox	BASF Corp.	Clearmax Herb. — 12.1%	G
Imazamox	BASF Corp.	Raptor Herb. — 12.1%	G
Imazamox	Sepro Corp.	Clearcast Herb. — 12.1%	G
Imazapic	Alligare	Panoramic 2SL — 23.3%	G
Imazapic	BASF Corp.	Cadre Herb. — 23.6%	G
Imazapic	BASF Corp.	Plateau Herb. — 23.6%	G
Imazapic	Makhteshim-Agan	Impose Herb. — 23.3%	G
Imazapic	Nufarm	Nufarm Imazapic 2SL Herb. — 23.3%	G
Imazapyr	Alligare	Alligare Ecomazapyr 2SL — 27.8%	G
Imazapyr	Alligare	Alligare Imazapyr 2SL — 27.8%	G

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Imazapyr	Alligare	Imazapyr 4SL — 52.6%	G
Imazapyr	Alligare	Rotary 2 SL — 27.8%	G
Imazapyr	Amtide	AmTide Imazapyr 2SL — 27.6%	G
Imazapyr	BASF Corp.	Arsenal Herb. — 27.8%	G
Imazapyr	BASF Corp.	Arsenal Herb. Applicators Conc. — 53.1%	G
Imazapyr	BASF Corp.	Arsenal PowerLine Herb. — 26.7%	G
Imazapyr	BASF Corp.	Chopper Gen2 Herb. — 26.7%	G
Imazapyr	BASF Corp.	Habitat Herb. — 28.7%	G
Imazapyr	BASF Corp.	Stalker Herb. — 27.6%	G
Imazapyr	Cont. Solutions	TVC — 27.8%	G
Imazapyr	DuPont	DuPont Imazapyr 75XP Herb. — 75%	G
Imazapyr	DuPont	DuPont Imazapyr II 75XP Herb. — 75%	G
Imazapyr	Ez-ject	EZ-Ject Copperhead Herb. Shells — 83.5%	G
Imazapyr	Nufarm Americas	Nufarm Polaris AC Complete Herb. — 53.1%	G
Imazapyr	Nufarm Americas	Nufarm Polaris AC Herb. — 53.1%	G
Imazapyr	Nufarm Americas	Nufarm Polaris Herb. — 27.7%	G
Imazapyr	Nufarm Americas	Nufarm Polaris SP — 27.6%	G
Imazapyr	Sepro Corp.	Habitat — 27.77%	G
Imazapyr	SSI Maxim Co.	Arsenal 5G Herb. — 5%	G
Imazapyr	Whitetail Inst. of N. America	Slay Herb. — 22.87%	G
Imazaquin	Ambrands	Image Herb. Consumer Conc. — 3.3%	G
Imazaquin	Ambrands	Image RTS Herb. Consumer Conc. — 3.3%	G
Imazaquin	BASF Corp.	Image 70 DG Herb. — 70%	G
Imazaquin	BASF Corp.	Scepter 70 DG Herb. — 70%	G
Imazethapyr	Albaugh	Thunder — 22.87%	G
Imazethapyr	BASF Corp.	Imazethapyr Herb. Tech. — 97.3%	G
Imazethapyr	BASF Corp.	Newpath Herb. for Clearfield rice — 22.87%	G
Imazethapyr	BASF Corp.	Pursuit Herb. — 22.87%	G
Imazethapyr	Cheminova	Tackle — 1.4%	G
Imazosulfuron	Valent U.S.A. Corp.	Celero Herb. — 75%	G
Imazosulfuron	Valent U.S.A. Corp.	League Herb. — 75%	G
Indaziflam	Bayer Cropscience	Alion Herb. — 19.05%	G
Indaziflam	Bayer Env. Science	Specticle 20 WSP Herb. — 20%	G
Indaziflam	Bayer Env. Science	Specticle Flo — 7.4%	G
Indaziflam	Bayer Env. Science	Specticle G — 0.02%	G
Indaziflam	Ohp	Marengo — 7.4%	G
Iodosulfuron-methyl-sodium	Bayer Cropscience	Autumn Herb. — 10%	G
Iron oxide	Bayer Advanced	Bayer Advanced Natria Lawn Weed Cont. Conc. — 26.52%	G
Iron oxide	Ortho Group	Ortho Ecosense Brand Lawn Weed Killer — 1.5%	G
Iron oxide	Ortho Group	Ortho Elementals Lawn Weed Killer — 1.5%	G
Iron phosphate	Swiss Farms Prod.	Whitney Farms Lawn Weed Killer — 1.5%	G
Iron sulfate	Bonide Prod.	Bonide MossMax Lawn Granules — 25.8%	G
Isoxaben	Dow Agrosciences	Gallery 75 Dry Flowable — 75%	G
Isoxaben	Dow Agrosciences	Gallery Tech. — 93.5%	G
Isoxaben	Makhteshim-Agan	Quali-Pro Isoxaben 75 WG — 75%	G
Isoxaben	Voluntary Purch. Groups	Ferti-lome Broad. Weed Cont. w/ Gallery — 0.38%	G
Isoxaflutole	Bayer Cropscience	Balance Flexx Herb. — 20%	R
Lactofen	Valent U.S.A. Corp.	Cobra Herb. — 24%	G
Lactofen	Valent U.S.A. Corp.	Phoenix Herb. — 24%	G
Linuron	Tessenderlo Kerley	Linex 4L — 40.6%	G
Linuron	Tessenderlo Kerley	Lorox DF — 50%	G
MCPA	Nufarm Americas	MCPA-4 Amine — 48.58%	G
MCPA	Nufarm Americas	Riverdale MCPA LV 4 Ester — 68.7%	G
MCPP-P-potassium	PBIGordon Corp.	Mecomec 4 Turf Herb. — 22.53%	G
Mecoprop-P	Nufarm Americas	MCPP-p 4 Amine — 26%	G
Mepiquat chloride	Albaugh	Mep Star — 4.2%	G
Mepiquat chloride	Albaugh	Mep Star 6X — 23.5%	G
Mesosulfuron-methyl	Bayer Cropscience	Osprey Herb. — 4.5%	G
Mesotrione	Scotts Co.	Turf Builder Starter Brand Fert. w/ Weed Prev. 21-22-4 — 0.08%	G
Mesotrione	Syngenta Crop Prot.	Callisto — 40%	G

Common chemical name	Company	Trade names and formulations	Use classification
Mesotrione	Syngenta Crop Prot.	Tenacity — 40%	G
Metolachlor	Drexel Chem. Co.	Drexel Me-Too-Lachlor Herb. — 86.4%	G
Metolachlor	Drexel Chem. Co.	Drexel Me-Too-Lachlor II — 84.4%	G
Metolachlor	Makhteshim-Agan	Parallel Herb. — 84.4%	G
Metolachlor	Makhteshim-Agan	Parallel PCS Herb. — 86.4%	G
Metolachlor	Sipcam Agro USA	Sipcam Metolachlor Tech. — 97%	G
Metolachlor	Sipcam Agro USA	Stalwart C Herb. — 84.1%	G
Metolachlor	Sipcam Agro USA	Stalwart Herb. — 86.4%	G
Metribuzin	Bayer Env. Science	Sencor 75% Turf Herb. — 75%	G
Metribuzin	Loveland Prod.	Metribuzin 75 — 75%	G
Metribuzin	Makhteshim-Agan	Glory — 75%	G
Metribuzin	Makhteshim-Agan	Metribuzin 75DF — 75%	G
Metribuzin	United Phosphorus	TriCor 4F — 41%	G
Metribuzin	United Phosphorus	TriCor DF — 75%	G
Metribuzin	Winfield Solutions	Dimetric DF 75% — 75%	G
Metsulfuron-methyl	Agsurf Corp.	Ciramet Herb. — 60%	G
Metsulfuron-methyl	Agsurf Corp.	Metcel VMF Herb. — 60%	G
Metsulfuron-methyl	Alligare	MSM 60 — 60%	G
Metsulfuron-methyl	Amtide	Amtide MSM 60 DF — 60%	G
Metsulfuron-methyl	Cheminova	Accurate Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Ally Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Ally XP Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Cimarron Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Cimarron Max Part A Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Cimarron Max Part A Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Escort XP Herb. — 60%	G
Metsulfuron-methyl	Farmsaver.com	Quali-Pro MSM Turf — 60%	G
Metsulfuron-methyl	Makhteshim-Agan	Quali-Pro MSM Turf — 60%	G
Metsulfuron-methyl	Nufarm	Purestand Sel. Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Manor Sel. Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Mansion Turf Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Patriot Sel. Herb. — 60%	G
Metsulfuron-methyl	Rotam N. America	Plotter Ag. Herb. — 60%	G
Metsulfuron-methyl	Rotam N. America	Rometsol Herb. — 60%	G
Metsulfuron-methyl	Scotts Co.	Ortho Weed B Gon Pro St. Augustine — 60%	G
MSMA	Drexel Chem. Co.	Drexel MSMA 6 Plus — 47.6%	G
MSMA	Drexel Chem. Co.	Drexel MSMA 6.6 — 51%	G
MSMA	Luxembourg-pamol	Target 6 Plus — 48.3%	G
MSMA	Luxembourg-pamol	Target 6.6 — 51%	G
Myclobutanil	Spectrum Group	Spectracide Immunox Lawn Disease Cont. Conc. — 2%	G
Naphthalene	Lawn and Garden Prod.	Sucker-Stopper RTU — 1.15%	G
Napropamide	United Phosphorus	Devrinol 50DF Orn. — 50%	G
Napropamide	United Phosphorus	Devrinol 50DF Sel. — 50%	G
Napropamide	United Phosphorus	Devrinol DF-XT — 50%	G
Nicosulfuron	Agsurf Corp.	Nicoval Herb. — 75%	G
Nicosulfuron	Cheminova	NIC-IT Herb. — 23.5%	G
Nicosulfuron	DuPont	DuPont Accent Herb. — 75%	G
Nicosulfuron	DuPont	DuPont Accent Q Herb. — 54.5%	G
Nicosulfuron	DuPont	DuPont Accent SC Herb. — 4.2%	G
Nicosulfuron	Makhteshim-Agan	Adapt — 75%	G
Nicosulfuron	Rotam N. America	Primero Ag. Herb. — 75%	G
Norflurazon	Syngenta Crop Prot.	Solicam DF — 78.6%	G
Octanoic acid	Loveland Prod.	Broclean — 33.4%	G
Orthosulfamuron	Isagro S.p.a.	Strada WG — 50%	G
Orthosulfamuron	Isagro S.p.a.	Strada XT — 50%	G
Oryzalin	Alligare	Alligare Oryzalin 4 — 41%	G
Oryzalin	Farmsaver.com	Quali-Pro Oryzalin 4 Pro — 41%	G
Oryzalin	Lawn and Garden Prod.	Weed Impede — 40.4%	G
Oryzalin	Lawn and Garden Prod.	Weed Impede Hose ‘Em — 3%	G
Oryzalin	Lesco	Lesco Surflan AS Specialty Herb. — 40.4%	G
Oryzalin	Loveland Prod.	Oryzalin Coated Granules — 1.67%	G
Oryzalin	Makhteshim-Agan	Oryzalin 4 AS — 41%	G

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Oryzalin	Makhteshim-Agan	Quali-Pro Oryzalin 4 — 41%	G
Oryzalin	United Phosphorus	Phoenix Harrier 4L — 40.4%	G
Oryzalin	United Phosphorus	Prokoz Surflan AS Specialty — 40.4%	G
Oryzalin	United Phosphorus	Surflan A S Specialty Herb. — 40.4%	G
Oryzalin	United Phosphorus	Surflan A.S. Ag. Herb. — 40.4%	G
Oxadiazon	Bayer Env. Science	Ronstar 50 WSP Herb. — 50%	G
Oxadiazon	Bayer Env. Science	Ronstar Flo Herb. — 34.1%	G
Oxadiazon	Bayer Env. Science	Ronstar G Herb. — 2%	G
Oxadiazon	Farmsaver.com	Quali-Pro Oxadiazon 2G — 2%	G
Oxadiazon	Farmsaver.com	Quali-Pro Oxadiazon 50 MC — 50%	G
Oxadiazon	Farmsaver.com	Quali-Pro Oxadiazon 50 WSB — 50%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 2G — 2%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 50 MC — 50%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon 50 WSB — 50%	G
Oxadiazon	Makhteshim-Agan	Quali-Pro Oxadiazon SC — 34.4%	G
Oxyfluorfen	Dow Agrosciences	Goal 2XL — 22.3%	G
Oxyfluorfen	Dow Agrosciences	Goal Tech. Purified — 99%	G
Oxyfluorfen	Dow Agrosciences	GoalTender — 41%	G
Oxyfluorfen	Makhteshim-Agan	Galigan 2E — 22.2%	G
Oxyfluorfen	Makhteshim-Agan	Galigan H2O — 41%	G
Oxyfluorfen	United Phosphorus	Collide Herb. — 22.3%	G
Paraquat dichloride	Drexel Chem. Co.	Drexel Quik-Quat — 43.2%	R
Paraquat dichloride	Makhteshim-Agan	Parazone 3SL — 43.8%	R
Paraquat dichloride	Sharda USA	Para-Shot 3.0 — 43.2%	R
Paraquat dichloride	Source Dynamics	Paraquat Conc. — 43.2%	R
Paraquat dichloride	Syngenta Crop Prot.	Gramoxone Inteon — 30.1%	R
Paraquat dichloride	Syngenta Crop Prot.	Gramoxone SL — 30.1%	R
Paraquat dichloride	Syngenta Crop Prot.	Gramoxone SL 2.0 — 30.1%	R
Pelargonic acid	BioSafe Systems	Axxe Broad Spectrum Herb. — 40%	G
Pelargonic acid	Gowan Co.	Scythe Herb. — 57%	G
Pendimethalin	BASF Corp.	Pendulum 2G granule Herb. — 2%	G
Pendimethalin	BASF Corp.	Pendulum 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF Corp.	Pendulum AquaCap Herb. — 38.7%	G
Pendimethalin	BASF Corp.	Prowl 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF Corp.	Prowl H2O Herb. — 38.7%	G
Pendimethalin	BASF Corp.	Prowl Herb. Tech. — 95%	G
Pendimethalin	Drexel Chem. Co.	Drexel Pin-Dee 3.3 T&O — 37.4%	G
Pendimethalin	Everris NA / Scotts Sierra Crop Prot.	Corral 2.68G — 2.68%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.15 — 1.15%	G
Pendimethalin	Helena Chem. Co.	Helena Pendimethalin — 37.4%	G
Pendimethalin	Ind. Agribusiness Pro.	PendiPro 3.3 EC Herb. — 37.4%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% + Fert. — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 3.3 EC Turf — 37.4%	G
Pendimethalin	Lesco	Lesco Pre-M Aquacap Herb. — 38.7%	G
Pendimethalin	Loveland Prod.	Stealth Herb. — 37.4%	G
Pendimethalin	Scotts Co.	Corral 2.68 G — 2.68%	G
Pendimethalin	Scotts Co.	Crabgrass Prev. + Fert. (Step 1) 26-0-3 — 1.22%	G
Pendimethalin	Scotts Co.	Crabgrass Prev. + Fert. (Step 1)32-3-8, 32-0-8 — 1.22%	G
Pendimethalin	Scotts Co.	Expert Gardener Crabgrass Prev. + Lawn Food 30-3-4 — 1.12%	G
Pendimethalin	Scotts Co.	Halts — 1.71%	G
Pendimethalin	Scotts Co.	Scotts Halts Crabgrass & Grassy Weed Prev. — 1.71%	G
Pendimethalin	Scotts Co.	Step 1 Crabgrass Prev. + Lawn Fert. 28-0-7 — 1.29%	G
Pendimethalin	Scotts Co.	Step 1 Crabgrass Prev. + Lawn Food 28-0-7 — 1.29%	G
Pendimethalin	Scotts Co.	Super Turf Builder w/ Halts Crabgrass Prev. 33-0-5 — 1.29%	G
Pendimethalin	Scotts Co.	Super Turf Builder w/ Halts Crabgrass Prev. 36-3-4 — 1.22%	G
Pendimethalin	Scotts Co.	Super Turf Builder w/ Halts Crabgrass Prev. 36-3-4, 36-0-4 — 1.24%	G
Pendimethalin	Scotts Co.	Turf Builder Halts Crabgrass Prev. w/ Lawn Food — 1.29%	G
Pendimethalin	Scotts Co.	Turf Builder w/ Halts Crabgrass Prev. 28-0-5 — 1.29%	G
Pendimethalin	Scotts Co.	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.22%	G
Pendimethalin	Scotts Co.	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.29%	G

Common chemical name	Company	Trade names and formulations	Use classification
Pendimethalin	Tenkoz	Acumen Herb. — 37.4%	G
Pendimethalin	United Phosphorus	Phoenix Hammerkop HydroCap — 38.7%	G
Pendimethalin	United Phosphorus	UP-End HydroCap — 38.7%	G
Pendimethalin	Winfield Solutions	Framework 3.3 EC — 37.4%	G
Penoxsulam	Dow Agrosciences	Grasp SC — 21.7%	G
Penoxsulam	Gro Tec	Expert Gardener South. Weed & Feed — 0.03%	G
Penoxsulam	Lebanon Seaboard Corp.	GreenView Broad. Weed Cont. Plus — 0.03%	G
Penoxsulam	Sepro Corp.	Galleon SC — 21.7%	G
Picloram	Alligare	Alligare Picloram 22K — 24.4%	R
Picloram	Dow Agrosciences	OutPost 22K — 24.4%	R
Picloram	Dow Agrosciences	Tordon 22K — 24.4%	R
Picloram	Dow Agrosciences	Tordon K — 24.4%	R
Picloram	Nufarm Americas	Trooper 22K Herb. — 24.4%	R
Pinoxaden	Syngenta Crop Prot.	Axial XL Herb. — 5.05%	G
Primisulfuron-methyl	Syngenta Crop Prot.	Beacon — 75%	G
Prodiamine	Agrium Advanced Tech.	Fert. w/ Barricade .295% — 0.3%	G
Prodiamine	Agrium Advanced Tech.	Fert. w/ Barricade .375% — 0.04%	G
Prodiamine	Alligare	Alligare Prodiamine 4L — 40.7%	G
Prodiamine	Alligare	Alligare Prodiamine 65 WG Herb. — 65%	G
Prodiamine	Easy Gardener Prod.	WeedBlock Pre-Emergent Northern — 0.22%	G
Prodiamine	Easy Gardener Prod.	WeedBlock Pre-Emergent South. — 0.38%	G
Prodiamine	Farmsaver.com	PrimeraOne Prodiamine 65 WDG — 65%	G
Prodiamine	Farmsaver.com	Quali-Pro Prodiamine 65 WDG — 65%	G
Prodiamine	Infinity Fert.	Sta-Green Crab-Ex Plus — 0.37%	G
Prodiamine	Lesco	Lesco Barricade 0.28% + Fert. 17-0-5 — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.28% + Fert. 25-0-5 — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.38% + Fert. — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% + Fert. 0-0-7 — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% + Fert. 19-0-6 — 0.38%	G
Prodiamine	Lesco	Lesco Stonewall — 65%	G
Prodiamine	Lesco	Lesco Stonewall 65 WDG Herb. — 65%	G
Prodiamine	Loveland Prod.	Evade 4 FL — 40.5%	G
Prodiamine	Loveland Prod.	Signature Crabgrass Prev. w/ Barricade 0.375% Plus — 0.38%	G
Prodiamine	Loveland Prod.	Signature Evade .375% Crabgrass Prev. Plus — 0.38%	G
Prodiamine	Makhteshim-Agan	Halts Pro — 65%	G
Prodiamine	Makhteshim-Agan	PrimeraOne Prodiamine 65 WDG — 65%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 4L — 40.8%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 65 MC Herb. — 65%	G
Prodiamine	Makhteshim-Agan	Quali-Pro Prodiamine 65 WDG — 65%	G
Prodiamine	Nufarm Americas	ProClipse 65 WDG — 65%	G
Prodiamine	Proactive	Pre-Amine 65 MC — 65%	G
Prodiamine	Proactive	Prodiamine Tech. — 97.5%	G
Prodiamine	Regal Chem. Co.	RegalKade 65WDG — 65%	G
Prodiamine	Scotts Co.	Halts Pro 0-0-7 + .28% Halts Pro — 0.28%	G
Prodiamine	Scotts Co.	Halts Pro 14-0-5 + .28% Halts Pro — 0.28%	G
Prodiamine	Scotts Co.	Halts Pro 14-2-5 + .28% Halts Pro — 0.28%	G
Prodiamine	Scotts Co.	Halts Pro 22-0-8 + .28% Halts Pro — 0.28%	G
Prodiamine	Scotts Co.	Halts Pro 24-0-8 + .28% Halts Pro — 0.28%	G
Prodiamine	Sipcam Agro USA	Cavalcade 65 WDG — 65%	G
Prodiamine	Sipcam Agro USA	PrimeraOne Prodiamine 65WDG Herb. — 65%	G
Prodiamine	Sipcam Agro USA	Sipcam Prodiamine Tech. — 94.8%	G
Prodiamine	South. States Coop.	CarpetMaker w/ .38% Barricade — 0.38%	G
Prodiamine	Syngenta Crop Prot.	Barricade 4FL Herb. — 40.7%	G
Prodiamine	Syngenta Crop Prot.	Barricade 65WG — 65%	G
Prodiamine	Syngenta Crop Prot.	Barricade MC — 65%	G
Prodiamine	Syngenta Crop Prot.	Endurance Herb. — 65%	G
Prodiamine	Syngenta Crop Prot.	Prodiamine 65 Manufacturing Use Product — 65%	G
Prodiamine	Syngenta Crop Prot.	Prodiamine Tech. — 96%	G
Prodiamine	Syngenta Crop Prot.	Resolute 4FL — 40.7%	G
Prodiamine	Syngenta Crop Prot.	Resolute 65WG Herb. — 65%	G
Prodiamine	Turf Care Supply Corp.	TCS GrowStar Turf Fert. + 0.42% Prodiamine — 0.42%	G

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Prometon	Amrep	Misty Weed-A-Cide CF — 4.66%	G
Prometon	Atco International	Scorched Earth — 3.75%	G
Prometon	Bonide Prod.	Bonide Total Veg. Killer — 2.2%	G
Prometon	Loveland Prod.	Pramitol 25E Herb. — 25%	G
Prometon	Makhteshim-Agan	Pramitol 25E Herb. — 25%	G
Prometon	Makhteshim-Agan	Sonora 4SC Herb. — 45.3%	G
Prometon	Ortho Group	Total Kill Veg. Killer Conc. — 1.86%	G
Prometon	Total Solutions	Turf King — 3.73%	G
Prometon	Universal Crop Prot. Alliance	Pramitol 25E — 25%	G
Prometon	Winfield Solutions	Pramitol 25E — 25%	G
Prometryn	Makhteshim-Agan	Cotton Pro — 44%	G
Prometryn	Syngenta Crop Prot.	Caparol 4L — 44.4%	G
Prometryn	Syngenta Crop Prot.	Prometryn Tech. — 97%	G
Pronamide	Dow Agrosciences	Kerb 50-W — 50%	R
Pronamide	Dow Agrosciences	Kerb 50WP — 50%	R
Pronamide	Dow Agrosciences	Kerb SC — 35.6%	R
Pronamide	Dow Agrosciences	Kerb SC T&O — 35.6%	R
Pronamide	Dow Agrosciences	Kerb WSP — 51%	R
Propanil	RiceCo	Propanil 36% — 35%	G
Propanil	RiceCo	RiceShot — 43.5%	G
Propanil	RiceCo	RiceShot 48 SF — 43.5%	G
Propanil	RiceCo	RiceShot LC* — 43.5%	G
Propanil	RiceCo	Stam 80 EDF — 81%	G
Propanil	RiceCo	Stam M4 — 44.8%	G
Propanil	RiceCo	SuperWHAM! — 41.2%	G
Propanil	RiceCo	SuperWHAM! DF — 60%	G
Propanil	Willowood	Willowood Propanil 4EC — 44.4%	G
Propanil	Willowood	Willowood Propanil 4SC — 41.4%	G
Propanil	Willowood	Willowood Propanil 80DF — 81%	G
Propiconazole	Albaugh	Propi-Star 2EC — 41.8%	G
Propionic acid	Agco Parts Division	Agco Buffered Acid — 64.5%	G
Propionic acid	Case Corp.	Thirty Plus — 64.5%	G
Propoxycarbazone-sodium	Bayer Cropscience	Olympus 70% Water Dispersible Granular Herb. — 70%	G
Propoxycarbazone-sodium	Wilbur Ellis Co.	Canter R+P — 70%	G
Prosulfuron	Syngenta Crop Prot.	Peak Custom-Pak — 57%	G
Pyraflufen-ethyl	Nichino America	Edict 2SC IVM — 2%	G
Pyraflufen-ethyl	Nichino America	ET Herb. — 2.5%	G
Pyraflufen-ethyl	Nichino America	Venue Herb. — 2%	G
Pyraflufen-ethyl	Sepro Corp.	Octane 2% SC — 2%	G
Pyrithiobac-sodium	Agsurf Corp.	Pysonex Herb. — 33.6%	G
Pyrithiobac-sodium	DuPont	DuPont Staple Herb. — 85%	G
Pyrithiobac-sodium	DuPont	DuPont Staple LX Herb. — 33.6%	G
Pyrithiobac-sodium	Makhteshim-Agan	Pyrimax 3.2L Herb. — 32.88%	G
Pyroxasulfone	BASF Corp.	Zidua Herb. — 85%	G
Pyroxsulam	Dow Agrosciences	PowerFlex — 7.5%	G
Pyroxsulam	Dow Agrosciences	PowerFlex HL — 13.13%	G
Quinclorac	Advan	Eject 4L Turf Herb. — 40%	G
Quinclorac	Albaugh	Armor Tech Quin Pro — 75%	G
Quinclorac	Albaugh	QuinStar — 75%	G
Quinclorac	Albaugh	QuinStar 4L — 40%	G
Quinclorac	Albaugh	QuinStar Turf — 75%	G
Quinclorac	BASF Corp.	Drive XLR8 Herb. — 18.92%	G
Quinclorac	BASF Corp.	Facet 75 DF Herb. — 75%	G
Quinclorac	BASF Corp.	Facet 75 DF Herb. — 75%	G
Quinclorac	BASF Corp.	Facet L Herb. — 18.92%	G
Quinclorac	BASF Corp.	Paramount Herb. — 75%	G
Quinclorac	BASF Corp.	Quinclorac Manufacturing Use Product — 98%	G
Quinclorac	Farmsaver.com	PrimeraOne Quinclorac 75 DF — 75%	G
Quinclorac	Farmsaver.com	Quali-Pro Quinclorac 75 DF — 75%	G

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Quinclorac	Makhteshim-Agan	PrimeraOne Quinclorac 75DF — 75%	G
Quinclorac	Makhteshim-Agan	Quali-Pro Quinclorac 75DF — 75%	G
Quinclorac	Makhteshim-Agan	Ryzon 75DF — 75%	G
Quinclorac	Nufarm Americas	Nufarm Quinclorac SPC 75 DF Herb. — 75%	G
Quinclorac	Select Source	Quinclorac Select 75DF — 75%	G
Quizalofop-p-ethyl	Canyon Group	Targa Herb. — 10.3%	G
Quizalofop-p-ethyl	DuPont	DuPont Assure II Herb. — 10.3%	G
Quizalofop-p-ethyl	Sharda USA	Se-CURE Herb. — 10.3%	G
Rimsulfuron	Agsurf Corp.	Rimgro Herb. — 25%	G
Rimsulfuron	Cheminova	Solida Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Matrix FNV Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Matrix Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Matrix SG Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Resolve DF Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Resolve Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Resolve SG Herb. — 25%	G
Rimsulfuron	DuPont	DuPont TranXit Herb. — 25%	G
Rimsulfuron	Makhteshim-Agan	Quali-Pro Rimsulfuron 25 DF — 25%	G
S-Metolachlor	DuPont	DuPont Cinch Herb. — 82.4%	G
S-Metolachlor	DuPont	DuPont Cinch Herb. — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Dual II G Magnum — 16%	G
S-Metolachlor	Syngenta Crop Prot.	Dual II Magnum — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Dual Magnum — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	Medal Ec — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	Medal Herb. — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	Medal II EC — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Medal II Herb. — 82.4%	G
S-Metolachlor	Syngenta Crop Prot.	Pennant Magnum — 83.7%	G
S-Metolachlor	Syngenta Crop Prot.	S-Metolachlor Tech. — 96%	G
S-Metolachlor	Tenkoz	Brawl Herb. — 83.7%	G
S-Metolachlor	Tenkoz	Brawl II Herb. — 82.4%	G
S-Metolachlor	Winfield Solutions	Charger Basic — 83.7%	G
S-Metolachlor	Winfield Solutions	Charger Max — 82.4%	G
Saflufenacil	BASF Corp.	Detail powered by Kixor Herb. — 29.74%	G
Saflufenacil	BASF Corp.	Sharpen Powered by Kixor Herb. — 29.74%	G
Saflufenacil	BASF Corp.	Treevix Powered by Kixor Herb. — 70%	G
Sethoxydim	BASF Corp.	Poast Herb. — 18%	G
Sethoxydim	BASF Corp.	Poast Plus Herb. — 13%	G
Sethoxydim	BASF Corp.	Segment Herb. — 13%	G
Sethoxydim	Bonide Prod.	Bonide Grass Beater Over-The-Top Grass Killer Conc. — 13%	G
Sethoxydim	Lawn and Garden Prod.	Grass Getter — 18%	G
Sethoxydim	Nufarm Americas	Nufarm Sethoxydim SPC — 13%	G
Sethoxydim	South. Ag. Insecticides	Grass Killer Contains Vantage — 13%	G
Sethoxydim	Voluntary Purch. Groups	Ferti-lome Over-The-Top Grass Killer — 18%	G
Sethoxydim	Voluntary Purch. Groups	Hi-Yield Grass Killer — 18%	G
Sethoxydim	Whitetail Inst. of N. America	Arrest Herb. — 0.13%	G
Siduron	PBIGordon Corp.	Tupersan Herb. Wettable Powder — 50%	G
Siduron	Scotts Co.	Starter Fert. w/ Crabgrass Prev. (Step 1 for Seeding) 18-23-4 — 3.1%	G
Simazine	Drexel Chem. Co.	Drexel Simazine 4L — 42.1%	G
Simazine	Drexel Chem. Co.	Drexel Simazine 90DF — 90%	G
Simazine	Loveland Prod.	Simazine 4L Flowable Herb. — 42.8%	G
Simazine	Loveland Prod.	Simazine 90 WDG Herb. — 90%	G
Simazine	Sipcam Agro USA	Sim-Trol 90 DF Herb. — 90%	G
Simazine	Sipcam Agro USA	Simtrol 4L Simazine Flowable Herb. — 42.8%	G
Simazine	Syngenta Crop Prot.	Princep 4L — 41.9%	G
Simazine	Syngenta Crop Prot.	Princep Caliber 90 Herb. — 90%	G
Simazine	Syngenta Crop Prot.	Princep Liquid — 41.9%	G
Simazine	Syngenta Crop Prot.	Simazine Tech. — 97%	G
Simazine	Winfield Solutions	Simazine 4L — 41.9%	G
Sulfentrazone	DuPont	DuPont Sulfentrazone XP Herb. — 75%	G

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Sulfentrazone	FMC Corp.	Dismiss Turf Herb. — 39.6%	G
Sulfentrazone	FMC Corp.	Ortho Weed B Gon FLEX — 39.6%	G
Sulfentrazone	FMC Corp.	Spartan 4F Herb. — 39.6%	G
Sulfentrazone	FMC Corp.	Sulfentrazone Tech. — 91%	G
Sulfentrazone	Ortho Group	Ortho Nutsedge Killer for Lawns — 0.05%	G
Sulfentrazone	Ortho Group	Ortho Nutsedge Killer for Lawns RTS— 1.4%	G
Sulfometuron methyl	Agsurf Corp.	Sulfomet XP Herb. — 75%	G
Sulfometuron methyl	Alligare	Alligare SFM 75 — 75%	G
Sulfometuron methyl	DuPont	DuPont Oust XP Herb. — 75%	G
Sulfometuron methyl	Nufarm Americas	Spyder Sel. Herb. — 75%	G
Sulfosulfuron	Monsanto Co.	Certainty Turf Herb. — 75%	G
Sulfosulfuron	Monsanto Co.	Maverick Herb. — 75%	G
Sulfosulfuron	Monsanto Co.	MON 37500 Tech. — 98%	G
Sulfosulfuron	Monsanto Co.	Outrider Herb. — 75%	G
Tebuconazole	Albaugh	TebuStar 3.6L — 38.7%	G
Tebuconazole	Sharda USA	Tebu-Crop3.6F — 38.7%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 20 P — 20%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 80 WG — 80%	G
Tebuthiuron	Dow Agrosciences	Spike 20P — 20%	G
Tebuthiuron	Dow Agrosciences	Spike 80DF — 80%	G
Tebuthiuron	SSI Maxim Co.	Sprakil S-5 Brush Cont. Granules — 5%	G
Tembotrione	Bayer Cropscience	Laudis Herb. — 34.5%	G
Terbacil	Tessenderlo Kerley	Sinbar WDG — 80%	G
Thiencarbazone	Bayer Cropscience	WG 63 Herb. — 21%	G
Thifensulfuron methyl	Cheminova	Edition Broadspec Herb. — 25%	G
Thifensulfuron methyl	Cheminova	Edition Tank Mix Herb. — 40%	G
Thifensulfuron methyl	Cheminova	Harass Herb. — 75%	G
Thifensulfuron methyl	DuPont	DuPont Harmony GT XP Herb. — 75%	G
Thifensulfuron methyl	DuPont	DuPont Harmony SG Herb. (w/ TotalSol Sol. granules) — 50%	G
Thifensulfuron methyl	DuPont	DuPont Harmony X-tra 1 Herb. — 50%	G
Thifensulfuron methyl	DuPont	Harmony GT Herb. — 75%	G
Thifensulfuron methyl	Nufarm	Treaty Herb. — 75%	G
Thifensulfuron methyl	Rotam N. America	Volta Ag. Herb. — 75%	G
Thiobencarb	K-i Chem. U.S.A.	Bolero Tech. — 97.4%	G
Thiobencarb	Valent U.S.A. Corp.	Bolero 8 EC — 84%	G
Topramezone	Amvac Chem. Corp.	Impact Herb. — 29.7%	G
Topramezone	BASF Corp.	Armezon Herb. — 29.7%	G
Topramezone	BASF Corp.	Frequency Herb. — 29.7%	G
Tribenuron-methyl	Cheminova	Nuance Herb. — 75%	G
Tribenuron-methyl	DuPont	DuPont Express Herb. (w/ TotalSol Sol. granules) — 50%	G
Tribenuron-methyl	DuPont	DuPont Express XP Herb. — 75%	G
Tribenuron-methyl	Nufarm	Victory Herb. — 75%	G
Triclopyr	Alligare	Alligare Triclopyr 3 — 44.4%	G
Triclopyr	Alligare	Alligare Triclopyr 4 — 61.6%	G
Triclopyr	Ambrands	Image Herb. Brush & Vine Killer — 8%	G
Triclopyr	Applied Biochemists	Navitrol DPF Aq. Herb. — 14%	G
Triclopyr	Applied Biochemists	Navitrol Landscape and Aq. Herb. — 44.4%	G
Triclopyr	Bayer Advanced	Bayer Adv. Brush Killer Plus Conc. — 8.8%	G
Triclopyr	Bayer Advanced	Bayer Adv. Brush Killer Plus RTS— 8.8%	G
Triclopyr	Bayer Advanced	Bayer Adv. Brush Killer Plus RTU — 0.8%	G
Triclopyr	Bonide Prod.	Bonide Stump-Out Stump & Vine Killer — 8.8%	G
Triclopyr	Cont. Solutions	Clear Pasture — 61.6%	G
Triclopyr	Dow Agrosciences	Element 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Element 4 — 61.6%	G
Triclopyr	Dow Agrosciences	forestry Garlon XRT — 83.9%	G
Triclopyr	Dow Agrosciences	Garlon 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Garlon 4 — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 4 Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Grandstand R — 44.4%	G
Triclopyr	Dow Agrosciences	Hammer — 44.4%	G
Triclopyr	Dow Agrosciences	Pathfinder II — 13.6%	G

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Triclopyr	Dow Agrosciences	Remedy — 61.6%	G
Triclopyr	Dow Agrosciences	Remedy Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Triclopyr Triethylamine Salt Solution — 44.4%	G
Triclopyr	Dow Agrosciences	Turflon Ester — 61.6%	G
Triclopyr	Dow Agrosciences	Turflon Ester Ultra — 60.45%	G
Triclopyr	Green Light Co.	Green Light Tough Brush Killer — 8.8%	G
Triclopyr	Helena Chem. Co.	Trycera — 29.4%	G
Triclopyr	Lawn and Garden Prod.	Turflon Ester — 60.45%	G
Triclopyr	Makhteshim-Agan	Triclopyr 3 SL — 44.4%	G
Triclopyr	Makhteshim-Agan	Triquad — 61.6%	G
Triclopyr	Nufarm Americas	Platform Herb. — 44.4%	G
Triclopyr	Nufarm Americas	Relegate RTU Herb. — 13.6%	G
Triclopyr	Nufarm Americas	Relegate Sel. Herb. — 61.6%	G
Triclopyr	Nufarm Americas	Tahoe 3A Herb. — 44.4%	G
Triclopyr	Nufarm Americas	Tahoe 4E Herb. — 61.6%	G
Triclopyr	Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer Conc. — 8%	G
Triclopyr	Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer RTU — 0.7%	G
Triclopyr	Ortho Group	Ortho Weed B Gon Chickweed, Clover & Oxalis Killer for Lawns Conc. — 8%	G
Triclopyr	Sepro Corp.	Renovate 3 — 44.4%	G
Triclopyr	Sepro Corp.	Renovate OTF — 14%	G
Triclopyr	South. Ag. Insecticides	Brush Killer — 8.8%	G
Triclopyr	Voluntary Purch. Groups	Ferti-lome Brush Killer Stump Killer — 8.8%	G
Triclopyr	Voluntary Purch. Groups	Ferti-lome Cut Vine & Stump Killer RTU — 8.8%	G
Triclopyr	Voluntary Purch. Groups	Hi-Yield Turflon Ester Ultra — 60.45%	G
Trifloxysulfuron-sodium	Syngenta Crop Prot.	Envoke — 75%	G
Trifloxysulfuron-sodium	Syngenta Crop Prot.	Monument 75WG — 75%	G
Trifluralin	Aceto Ag. Chem. Corp.	Aceto Trifluralin 4 EC Herb. — 43%	G
Trifluralin	Albaugh	Trifluralin 4E — 43%	G
Trifluralin	Andersons Lawn Fert. Div.	Andersons Professional Turf Prod. Weed & Grass Prev. w/ 5% Treflan Herb. — 5%	G
Trifluralin	Andersons Lawn Fert. Div.	Easy Weed & Green 9-17-9 — 0.74%	G
Trifluralin	Andersons Lawn Fert. Div.	Easy Weeder Flower and Garden Weed Prev. — 1.47%	G
Trifluralin	Dow Agrosciences	Treflan 5G — 5%	G
Trifluralin	Dow Agrosciences	Treflan E.C. Weed and Grass Prev. — 43%	G
Trifluralin	Dow Agrosciences	Treflan HFP — 43%	G
Trifluralin	Dow AgroSciences (Dintec Agrichemicals)	Tech. Trifluralin — 96.3%	G
Trifluralin	Dow AgroSciences (Dintec Agrichemicals)	Treflan 4D — 43%	G
Trifluralin	Fiberweb	Biobarrier Root Cont. System — 17.5%	G
Trifluralin	Helena Chem. Co.	Treflan 4 EC — 43%	G
Trifluralin	Helena Chem. Co.	Trifluralin 4 EC — 43%	G
Trifluralin	Lawn and Garden Prod.	Vegetable and Orn. Weeder — 43%	G
Trifluralin	Lebanon Seaboard Corp.	Lebanon Treflan 5G — 5%	G
Trifluralin	Lebanon Seaboard Corp.	Preen Garden Weed Prev. — 1.49%	G
Trifluralin	Lebanon Seaboard Corp.	Preen Mulch Plus — 0%	G
Trifluralin	Loveland Prod.	Trifluralin 10G — 10%	G
Trifluralin	Loveland Prod.	Trifluralin HF — 43%	G
Trifluralin	Makhteshim-Agan	Triflurex HFP — 42.78%	G
Trifluralin	Miracle Gro Lawns Prod.	Miracle-Gro Garden Weed Prev. 1 — 1.47%	G
Trifluralin	Miracle Gro Lawns Prod.	Miracle-Gro Shake 'N Feed All Purpose Plant Food + Weed Prev. 1 10-10-10 — 0.15%	G
Trifluralin	Tenkoz	Tenkoz Trifluralin 4 Emulsifiable Conc. — 43%	G
Trifluralin	Universal Crop Prot. Alliance	Trifluralin 4EC — 43%	G
Trifluralin	Voluntary Purch. Groups	Hi-Yield Herb. Granules Containing Treflan — 1.47%	G
Trifluralin	Winfield Solutions	Trust Herb. — 43%	G
Plant Growth Regulators			
1-Methylcyclopropene	Agro Fresh	SmartFresh ProTabs — 2%	G
1-Methylcyclopropene	Agro Fresh	SmartFresh — 3.3%	G

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1-Methylcyclopropene	Agro Fresh	SmartFresh SmartTabs — 0.63%	G
1-Methylcyclopropene	Agro Fresh	AFxRD-038 — 3.8%	G
Acifluorfen	Redeagle International	Acifluorfen 2 — 20.1%	G
Adenine	Fine Americas	Configure — 2%	G
Ancymidol	Fine Americas	Abide — 0.03%	G
Ancymidol	Sepro Corp.	A-Rest — 0.03%	G
Aviglycine hydrochloride	Valent Biosciences Corp.	ReTain Plant Growth Reg. Soluble — 15%	G
Butanedioic acid	Chemtura Corp.	B-Nine WSG — 85%	G
Chlormequat chloride	Fine Americas	Citadel — 11.8%	G
Chlormequat chloride	Nufarm Americas	Nufarm Chlormequat SPC Plant Growth Reg. — 11.8%	G
Chlormequat chloride	Ohp	Cycocel Plant Growth Reg. — 11.8%	G
Copper hydroxide	Sepro Corp.	SpinOut — 7.1%	G
Cytokinin	P.B.T.	Cytokin BioReg. Conc. — 0.01%	G
Cytokinin (as kinetin)	Acadian Seaplants Ltd.	Stimplex Crop Biostimulant — 0.01%	G
Cytokinin (as kinetin)	Bonide Prod.	Bonide Tomato & Blossom Set Spray RTU — 0%	G
Cytokinin (as kinetin)	CP Bio	Kinetin Technical — 98.5%	G
Cytokinin (as kinetin)	Loveland Prod.	Validate — 0.5%	G
Cytokinin (as kinetin)	Stoller Ent.	X-CYTE — 0.04%	G
Cytokinin (as kinetin)	Voluntary Purch. Groups	Ferti-lome Tomato & Pepper Set RTU — 0%	G
Daminozide	Fine Americas	Dazide 85 WSG — 85%	G
Daminozide	Ohp	B-Nine WSG — 85%	G
Dichlobenil	Ohp	Casoron 4G — 4%	G
Dikegulac sodium	Ohp	Augeo Plant Growth Reg. — 18.5%	G
Dikegulac sodium	PBIGordon Corp.	Atrimmec Plant Growth Reg. — 18.5%	G
Dithiopyr	Gro Tec	Pennington Signature Series Crabgrass Prev. — 0.25%	G
Ethephon	Arysta Lifescience N. Am.	Ethephon 6 — 55.4%	G
Ethephon	Bayer Cropscience	Florel Brand Ethephon Plant Growth Reg. — 3.9%	G
Ethephon	Bayer Cropscience	Ethrel Brand Ethephon Plant Reg. — 21.7%	G
Ethephon	Bayer Cropscience	Cerone Brand Ethephon Plant Reg. — 39.9%	G
Ethephon	Bayer Env. Science	Proxy Growth Reg. — 21.7%	G
Ethephon	Direct Ag Source	Harvest Pro — 55.4%	G
Ethephon	DuPont	DuPont Super Boll Plant Reg. — 55.4%	G
Ethephon	Farmsaver.com	Quali-Pro Ethephon 2 SL — 21.7%	G
Ethephon	Fuzion Tech.	Boll Doze — 55.4%	G
Ethephon	Helena Chem. Co	Flash — 27%	G
Ethephon	Ind. Agribusiness Prof.	HarvestPro Plant Growth Reg. — 55.4%	G
Ethephon	Ind. Agribusiness Prof.	HarvestPro Plant Growth Reg. — 54%	G
Ethephon	Lawn and Garden Prod.	Florel Brand Growth Reg. — 3.9%	G
Ethephon	Loveland Prod.	Boll Buster — 55.4%	G
Ethephon	Makhteshim-Agan	Setup 6SL — 55.4%	G
Ethephon	Makhteshim-Agan	Quali-Pro Ethephon 2SL — 21.7%	G
Ethephon	Nufarm Americas	Super Boll Plant Reg. — 55.4%	G
Ethephon	Nufarm Americas	Nufarm Ethephon 2 PGR — 21.7%	G
Ethephon	Redeagle International	Ethephon 78% MUP — 77.6%	G
Ethephon	South. Ag. Insecticides	Florel Plant Growth Reg. — 3.9%	G
Ethephon	Winfield Solutions	Boll'd 6 — 54%	G
Ethephon	Winfield Solutions	Boll'd — 55.4%	G
Ethylene	Airgas Specialty Gases	Ethylene — 98.5%	G
Ethylene	Balchem Corp.	Ethylene Release Canister ERC — 99.5%	G
Flumetralin	Syngenta Crop Prot.	Prime+ EC — 15%	G
Flurprimidol	Sepro Corp.	Cutless 0.33G — 0.33%	G
Flurprimidol	Sepro Corp.	Cutless 50W — 50%	G
Flurprimidol	Sepro Corp.	Topflor — 0.38%	G
Flurprimidol	Sepro Corp.	Topflor Granular — 0.17%	G
Flurprimidol	Sepro Corp.	Cutless MEC — 16%	G
Gibberellic acid	Nufarm Americas	GibGro 20% Powder — 20%	G
Gibberellic acid	Nufarm Americas	GibGro 4LS — 4%	G
Gibberellic acid	Stoller Ent.	N-LARGE — 4%	G
Gibberellic acid	Stoller Ent.	N-Large Premier — 6.26%	G
Gibberellic acid	Stoller Ent.	N-Large 10SP — 10%	G
Gibberellic acid	Valent Biosciences Corp.	VBC-30110 Plant Growth Reg. Water Sol. Gran. — 40%	G

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Gibberellic acid	Valent Biosciences Corp.	RyzUp 40% Water Sol. Gran. Plant Growth Reg. — 40%	G
Gibberellic acid	Valent Biosciences Corp.	RyzUp SmartGrass Plant Growth Reg. Water Sol. Gran. — 40%	G
Gibberellic acid	Valent Biosciences Corp.	ProGibb 40% Water Sol. Gran. Plant Growth Reg. — 40%	G
Gibberellic acid	Valent Biosciences Corp.	RyzUp Plant Growth Reg. — 4%	G
Gibberellic acid	Valent Biosciences Corp.	ProGibb T&O Plant Growth Reg. Sol. — 4%	G
Gibberellic acid	Valent Biosciences Corp.	ProGibb 4% Plant Growth Reg. Sol. — 4%	G
Gibberellic acid	Valent Biosciences Corp.	Release Plant Growth Reg. Soluble Powder — 10%	G
Gibberellin	Valent Biosciences Corp.	Release LC Plant Growth Reg. Sol. — 4%	G
Gibberellin A4 mixt. w/ Gibberellin A7	Valent Biosciences Corp.	ProCone Plant Growth Reg. Sol. — 4%	G
Harpin alpha beta	Plant Health Care	ProAct Foliar Spray — 1%	G
Harpin alpha beta	Plant Health Care	Employ H&T — 1%	G
Harpin alpha beta	Plant Health Care	Messenger Gold (H&G) — 1%	G
Hydrogen cyanamide	Alzchem Trostberg Gmbh	Dormex — 50%	R
IBA	Bonide Prod.	Bonide Bontone Rooting Powder — 0.1%	G
IBA	Brooker Chem. Corp.	Hormex Rooting Powder #1 — 0.1%	G
IBA	CP Bio	IBA Tech — 98%	G
IBA	Green Light	Green Light Root Stimulator & Starter Sol. 5-15-5 — 0%	G
IBA	Helena Chem. Co	Kickstand PGR — 0.01%	G
IBA	Schultz Co.	Garden Safe Brand TakeRoot Rooting Hormone — 0.1%	G
IBA	Schultz Co.	Schultz TakeRoot Rooting Hormone 2 — 0.1%	G
IBA	Techpac	Garden Tech RootBoost Rooting Hormone — 0.1%	G
IBA	Voluntary Purch. Groups	Ferti-lome Root Stimulator & Plant Starter Sol. — 0%	G
Indole	Ohp	Hormodin 2 — 0.3%	G
Indole	Ohp	Hormodin 3 — 0.8%	G
Indole	Ohp	Hormodin 1 — 0.1%	G
Kinetin (plant hormone)	CP Bio	HappyGro — 0.5%	G
Maleic hydrazide	Chemtura Corp.	Royal MH-30 SG — 21.7%	G
Maleic hydrazide	Chemtura Corp.	Royal MH-30 Xtra — 30.3%	G
Maleic hydrazide	Chemtura Corp.	Royal MH-30 — 21.7%	G
Mefluidide	PBIGordon Corp.	Embark 2-S Plant Growth Reg. — 28%	G
Mefluidide	PBIGordon Corp.	Embark Turf and Ornamental Growth Reg. — 3.2%	G
Mepiquat chloride	Aceto Ag. Chem. Corp	Aceto Mepiquat 4.2% Plant Reg. — 4.2%	G
Mepiquat chloride	AgSaver	Mepit — 4.2%	G
Mepiquat chloride	Arysta Lifescience N. Am.	Mepichlor 4.2% Liquid — 4.2%	G
Mepiquat chloride	Arysta Lifescience N. Am.	Pix Ultra — 3.9%	G
Mepiquat chloride	Arysta Lifescience N. Am.	Pix WSG — 90%	G
Mepiquat chloride	Direct Ag Source	Flat Top MC — 4.2%	G
Mepiquat chloride	Drexel Chem. Co.	Drexel MEP 42 — 4.2%	G
Mepiquat chloride	Fuzion Tech.	Brazos — 4.2%	G
Mepiquat chloride	Loveland Prod.	Mepiquat — 4.2%	G
Mepiquat chloride	Makhteshim-Agan	Mepiquat Chloride 4.2% Liquid — 4.2%	G
Mepiquat chloride	Nufarm Americas	Mepex Plant Growth Reg. — 4.2%	G
Mepiquat chloride	Tacoma Ag	Mepiquat PGR — 4.2%	G
Mepiquat chloride	Tf Holdings I	Mepiquat Chloride 4.2 — 4.2%	G
Mepiquat chloride	Willowood	Willowood Mepi Chlor 4.2% — 4.2%	G
Mepiquat chloride	Winfield Solutions	Compact — 4.2%	G
Mepiquat chloride	Winfield Solutions	Compact — 4.2%	G
Mepiquat pentaborate	BASF Corp.	Pentia Plant Reg. — 9.6%	G
Naphthalene	Amvac Chem. Corp.	K Salt Fruit Fix 800 — 24.2%	G
Naphthalene	Amvac Chem. Corp.	K Salt Fruit Fix 200 — 6.25%	G
Paclobutrazol	Fine Americas	Piccolo — 0.4%	G
Paclobutrazol	Fine Americas	Piccolo 10 XC — 4%	G
Paclobutrazol	Greenleaf Chem.	Downsize (Pacobutrazol 0.4%) — 0.4%	G
Paclobutrazol	Greenleaf Chem.	Shortstop Plant Growth Reg. for Trees — 22.3%	G
Paclobutrazol	Ohp	Paczol Ornamental Growth Reg. — 0.4%	G
Paclobutrazol	Sepro Corp.	Profile 2SC — 21.8%	G
Paclobutrazol	Syngenta Crop Prot.	Trimmit 2SC Plant Growth Reg. — 22.3%	G
Paclobutrazol	Syngenta Crop Prot.	Clarelle — 22.9%	G
Paclobutrazol	Syngenta Crop Prot.	Bonzi Ornamental Growth Reg. — 0.4%	G

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Paclobutrazol	Syngenta Crop Prot.	Paclo Pro Ornamental Growth Reg. — 0.4%	G
Paclobutrazol	Water Env. Tech.	Bush Load Paclo 0.4% — 0.4%	G
Paclobutrazol	Zhejiang Tide Cropscience Co.	Tide Paclo 2SC — 22.3%	G
Prodiamine	Gro Tec	Expert Gardener Crabgrass Prev. + Fert. 30-0-4 — 0.29%	G
Prodiamine	Gro Tec	Pennington Crabgrass Prev. + Lawn Fert. 5-10-25 — 0.38%	G
Prohexadione calcium	BASF Corp.	Apogee Plant Growth Reg. — 27.5%	G
Trinexapac-ethyl	Farmsaver.com	Quali-Pro T-Nex 1 AQ — 11.3%	G
Trinexapac-ethyl	Farmsaver.com	PrimeraOne Trinexapac-ethyl 1 AQ — 11.3%	G
Trinexapac-ethyl	Lesco	Lesco Regimax PGR Plant Growth Reg. — 11.3%	G
Trinexapac-ethyl	Loveland Prod.	Game Up Plant Growth Reg. — 11.3%	G
Trinexapac-ethyl	Makhteshim-Agan	Quali-Pro T-NEX 1 AQ — 11.3%	G
Trinexapac-ethyl	Makhteshim-Agan	PrimeraOne Trinexapac Ethyl 1 AQ — 11.3%	G
Trinexapac-ethyl	Nufarm Americas	Nufarm T-Pac SPC MEC Plant Growth Reg. — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Palisade 2EC — 25.5%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Trinexapac-Ethyl Technical — 97%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Primo Maxx — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Podium — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	Palisade EC — 12%	G
Uniconazole	Fine Americas	Concise — 0.06%	G
Uniconazole	Valent U.S.A. Corp.	Sumagic Plant Growth Reg. — 0.06%	G
Urea, sulfate (1:1)	DuPont	DuPont Urea Sulfate-MP — 79%	G
		Defoliants	
Diquat dibromide	Syngenta Crop Prot.	Reglone Desiccant — 37.3%	G
Ethephon	Bayer Cropscience	Prep Brand Ethephon for Cotton and Tobacco — 55.4%	G
Fluthiacet-methyl	Chemtura Corp.	Blizzard — 10.3%	G
Fluthiacet-methyl	Chemtura Corp.	Blizzard — 10.3%	G
Imidacloprid	Sharda USA	Sharda Imidacloprid 5SC — 48.7%	G
Isopropyl myristate	Bayer Healthcare	Resultix — 50%	G
Paraquat dichloride	Chemtura Corp.	Firestorm — 43.8%	R
Paraquat dichloride	Helm Agro	Helmquat 3SL — 43.8%	R
Paraquat dichloride	Helm Agro	Helmquat 3SL — 43.8%	R
Sodium chlorate	CoreAgri	CoreAgri Polyfoliant V Defoliant-Desiccant — 45%	G
Sodium chlorate	Drexel Chem. Co.	Drexel Defol — 28%	G
Sodium chlorate	Drexel Chem. Co.	Drexel Defol 5 — 42.3%	G
Sodium chlorate	Drexel Chem. Co.	Drexel Defol 750 — 52%	G
Sodium chlorate	Tronox	Tronox Sodium Chlorate — 99.5%	R
Sodium chlorate	Tronox	Tronox Sodium Chlorate Sol. — 43.7%	R
Thidiazuron	Arysta Lifescience N. Am.	Thidiazuron 4SC — 42.4%	G
Thidiazuron	Bayer Cropscience	Dropp SC Cotton Defoliant — 41%	G
Thidiazuron	Direct Ag Source	Detach Ultra — 42.4%	G
Thidiazuron	Loveland Prod.	Take Down SC Cotton Defoliant — 42.4%	G
Thidiazuron	Makhteshim-Agan	Klean-Pik 500SC — 42.4%	G
Thidiazuron	Nufarm Americas	FreeFall SC Cotton Defoliant — 42.4%	G
Thidiazuron	Winfield Solutions	Daze 4SC — 42.4%	G
Tribufos	Amvac Chem. Corp.	Folex 6EC Cotton Defoliant — 70.5%	G
Tribufos	Bayer Cropscience	Def 6 Emulsifiable Defoliant Very Low Odor — 70.5%	G
Tribufos	Redeagle International	Tribufos 6 — 70.5%	G
		Fumigants	
1-Methylcyclopropene	Flora Life	EthylBloc — 0.14%	G
1-Methylcyclopropene	Flora Life	EthylBloc Sachet — 0.01%	G
1,3-Dichloropropene	Dow Agrosciences	Curfew — 97.5%	R
1,3-Dichloropropene	Dow Agrosciences	Telone II — 97.5%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Tablets — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Pellets — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Sachet Chain (100) — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastoxin Fumigation Sachets (6) — 57%	R
Aluminum phosphide	Bernardo Chem.	Gastion Fumigation Sachets (50) — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Tablets — 55%	R

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Aluminum phosphide	D&D Holdings	Detia Fumex Bags — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Prepac Rope — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablet Prepac — 55%	R
Aluminum phosphide	Douglas Prod. and Pack. Co.	Phosfume 2 Aluminum Phosphide Fumigation Pellets — 60%	R
Aluminum phosphide	Douglas Prod. and Pack. Co.	PH 3 Aluminum Phosphide Fumigation Pellets — 60%	R
Aluminum phosphide	Douglas Prod. and Pack. Co.	Phosfume 2 Tablets — 60%	R
Aluminum phosphide	ROC Ent.	Killz-All 60 Tablets — 60%	R
Aluminum phosphide	ROC Ent.	Killz-All 60 Pellets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Tablets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Pellets — 60%	R
Aluminum phosphide	United Phosphorus	Weevil-Cide Gas Bags — 60%	R
Chloropicrin	TriEst Ag Group	Tri-Pic 100 Fumigant — 99%	R
Chloropicrin	TriEst Ag Group	Pic Plus Fumigant — 85.5%	R
DMDS	Arkema	Paladin — 99.8%	R
DMDS	Arkema	Paladin EC — 93.8%	R
Ethylene oxide	ARC Specialty Prod.	Ethylene Oxide — 100%	G
Magnesium phosphide	D&D Holdings	Degesch Magtoxin Granules — 94.6%	R
Magnesium phosphide	D&D Holdings	Degesch Fumicel / Strip — 56%	R
Magnesium phosphide	D&D Holdings	Degesch Magtoxin Perpac Spot Fumigant — 66%	R
Malathion	Douglas Prod. and Pack. Co.	MaxKill Dusta-Cide 6 — 6%	G
Metam sodium	Tessenderlo Kerley	Sectagon 42 — 42.2%	R
Metam-sodium	Amvac Chem. Corp.	Vapam HL Soil Fumigant — 42%	R
Metam-sodium	Douglas Prod. and Pack. Co.	Sanafoam Vaporooter II — 30%	R
Metampotassium	Amvac Chem. Corp.	K-Pam HL — 54%	R
Methyl bromide	Great Lakes Chem. Corp.	Meth-O-Gas 100 — 100%	R
Methyl bromide	Great Lakes Chem. Corp.	Meth-O-Gas Q — 100%	R
Methyl bromide	ICL-IP America	Metabrom 100 — 100%	R
Methyl bromide	TriEst Ag Group	Methyl Bromide 100 — 100%	R
Methyl bromide	ICL-IP America	Metabrom Q — 100%	R
Paraformaldehyde	Noble Pine Products Co.	Steri Dri — 62.3%	G
Phosphine gas	Cytec Industries	Eco2Fume Fumigant Gas — 2%	R
Phosphine gas	Cytec Industries	Vaporph3OS Phosphine Fumigant — 99.3%	R
Sulfuryl fluoride	Dow Agrosciences	ProFume — 99.8%	R
Sulfuryl fluoride	Dow Agrosciences	Vikane — 99.8%	R
		Weed and Feed	
Aminocyclopyrachlor	Scotts Co.	Turf Builder Bonus S South. Weed & Feed 32-0-8 — 0.02%	G
Aminocyclopyrachlor	Scotts Co.	Turf Builder Weed & Feed 30-0-4 — 0.07%	G
Aminocyclopyrachlor	Scotts Co.	Snap Pac Weed & Feed 2 32-0-8 — 0.02%	G
Aminocyclopyrachlor	Scotts Co.	Snap Pac Weed & Feed 2 28-0-4 — 0.06%	G
Atrazine	Scotts Co.	Bonus S 29-1-10 — 1.29%	G
Atrazine	Scotts Co.	Super Bonus S 1 South. Weed & Feed 26-2-14 — 1.17%	G
Atrazine	Scotts Co.	Turf Builder Bonus S South. Weed & Feed2 — 1.29%	G
Atrazine	Scotts Co.	Weed & Feed For St. Augustinegrass Weed Cont. + Lawn Fertilizer — 1.38%	G
Atrazine	Scotts Co.	Super Turf Builder Bonus S South. Weed & Feed — 1.29%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green South. Weed & Feed w/ Atrazine 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Ultra Turf Phosphorus Free South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green South. Weed & Feed 29-0-4 — 1.38%	G
Atrazine	Lesco	LESCO Atrazine 0.76% + Fert. — 0.76%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. 20-0-20 — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. 22-0-11M — 1.05%	G

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Atrazine	Gro Tec	Pennington Signature Series Centipede & St. Augustine Weed & Feed — 1.1%	G
Atrazine	Voluntary Purch. Groups	Ferti-lome St. Augustine Weed & Feed — 0.81%	G
Atrazine	Turf Care Supply Corp.	TCS GrowStar Atrazine 0.76% + Fert. — 0.76%	G
Atrazine	Turf Care Supply Corp.	TCS GrowStar Atrazine 1.05% + Fert. — 1.05%	G
Atrazine	Turf Care Supply Corp.	TCS GrowStar Atrazine 0.92% + Fert. — 0.92%	G
Bifenthrin	Bonide Prod.	Bonide DuraTurf Insect & Feed — 0.07%	G
Bifenthrin	Loveland Prod.	Signature Fert. w/ 0.073% Talstar LC — 0.73%	G
Corn gluten meal	Woodstream Corp.	Concern Weed Prevention + Lawn Food 8-2-4 — 82%	G
Dichlorprop-p	Andersons Lawn Fert. Div.	American Green Weed & Feed 16-4-8 — 1.11%	G
Dithiopyr	Scotts Co.	Snap Pac Fert. w/ Crabgrass Prev. 30-0-4 — 0.2%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Crabgrass Prev. & Lawn Fert. 30-0-4 — 0.2%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Ultra Turf Phosphorus Free Turf Fert. w/ Weed Stop 30-0-4 — 0.2%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.10 + Fert. — 0.1%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.19% + Fert. — 0.19%	G
Dithiopyr	Andersons Lawn Fert. Div.	The Andersons Turf Prod. Fert. w/ 0.25% Dimension Turf Herb. 21-0-10 — 0.25%	G
Dithiopyr	Andersons Lawn Fert. Div.	Fortify Crabgrass Prev. + Lawn Food 20-0-4 — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.19% + Turf & Orn. 25-0-5 — 0.19%	G
Dithiopyr	Lesco	Dimension 0.15% + Fert — 0.15%	G
Dithiopyr	Lesco	Dimension Crabgrass Pre-emergent + Fert 19-0-7 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.15% + Fert 19-0-2 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.15% + Fert 19-0-6 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.21% + Fert — 0.21%	G
Dithiopyr	Lesco	Dimension 0.21% + Fert 0-0-7 — 0.21%	G
Dithiopyr	Lesco	Dimension 0.21% + Fert 18-0-10 — 0.21%	G
Dithiopyr	Lebanon Seaboard Corp.	Ace Green Turf Crabgrass Prev. w/Fert 36-0-4 — 0.11%	G
Dithiopyr	Lebanon Seaboard Corp.	Greenview Broadleaf Weed Cont. + Lawn Food — 0.19%	G
Dithiopyr	Lebanon Seaboard Corp.	Ace Green Turf Crabgrass Prev. w/Fert 30-0-4 — 0.19%	G
Dithiopyr	Voluntary Purch. Groups	Ferti-lome Weed & Feed w/ Dimension — 0.13%	G
Dithiopyr	Voluntary Purch. Groups	Ferti-lome Wint. & Weed Prev. II for South. Grasses — 0.13%	G
Dithiopyr	Knox Fert. Co.	KGRO Prem. Crabgrass Prev. 30-0-3 — 0.13%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.19% — 0.19%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.25% — 0.25%	G
Dithiopyr	Harrell's	Fert. w/ Dimension 0.15% — 0.15%	G
Dithiopyr	Turf Care Supply Corp.	TCS Growstar Dimension 0.25% + Fert. — 0.25%	G
Dithiopyr	Howard Johnson's Ent.	Howard Johnson's Prevents Crabgrass Plus w/ 0.172% Dimension — 0.17%	G
Gibberellic acid	Frit Industries	Green-Sol Sul15Plus — 0.03%	G
Imidacloprid	Voluntary Purch. Groups	Ferti-lome Azalea/Evergreen Food Plus w/ Systemic — 0.2%	G
Imidacloprid	Voluntary Purch. Groups	Ferti-lome Palm Tree Food w/ Systemic — 0.2%	G
Kinetin (plant hormone)	Frit Industries	Green-Sol GS70 — 0.02%	G
Mesotrione	Scotts Co.	Turf Builder Starter Food For New Grass + Weed Preventer — 0.08%	G
Mesotrione	Scotts Co.	Step 1 For Seeding Starter Lawn Food W/ Weed Preventer — 0.08%	G
Oryzalin	Harrell's	Fert. w/ Surflan 1.0% — 1%	G
Oryzalin	Harrell's	Fert. w/ Surflan 0.75% — 0.75%	G
Oxadiazon	Andersons Lawn Fert. Div.	Andersons Golf Prod. 15-5-10 Fert. + 1.0% Ronstar — 1%	G
Oxadiazon	Andersons Lawn Fert. Div.	Andersons Golf Prod. Turf Fert. 20-4-10 w/ Ronstar Herb. — 1.38%	G
Oxadiazon	Lesco	Oxadiazon 0.95% + Fert — 0.95%	G
Oxadiazon	Lesco	Ronstar 0.95% + Fert — 0.95%	G
Oxadiazon	Lesco	Ronstar 0.95% + Fert 30-0-0 — 0.95%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 0.75% — 0.75%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 0.95% — 0.95%	G
Oxadiazon	Harrell's	Fert. w/ Ronstar 1.2% — 1.2%	G
Oxadiazon	Turf Care Supply Corp.	TCS GrowStar Oxadiazon 0.67% + Turf Fert. — 0.67%	G
Oxadiazon	Turf Care Supply Corp.	TCS Growstar Oxadiazon 1.5 plus Turf Fert. — 1.5%	G
Pendimethalin	Andersons Lawn Fert. Div.	The Andersons Turf Prod. Fert. w/ 0.86% ProPendi Herb. 0-0-7 — 0.86%	G

Common chemical name	Company	Trade names and formulations	Use classification
Pendimethalin	Andersons Lawn Fert. Div.	The Andersons Professional Turf Prod. Fert. 5-5-25 w/ ProPendi Herb. — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 1.5% + Fert. — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 1.5% + Fert. 0-0-8 — 1.5%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% Crabgrass Pre-Emergent + Potash 0-0-7 — 1.5%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% Flus Fert 0-0-7 Mini — 0.86%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% + Fert 19-3-7 — 0.86%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% + Fert 19-3-7 — 0.86%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% + Fert (088515) — 0.86%	G
Pendimethalin	Lesco	LESCO Pre-M 0.86% + Fert (088494) — 0.86%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.86 — 0.86%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.75% — 0.75%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.0% — 1%	G
Pendimethalin	Howard Johnson's Ent.	Pendimethalin 0.86% + 0-0-7 — 0.86%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 0-0-7M — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 17-0-7 — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 21-0-7M — 0.03%	G
Penoxsulam	Lebanon Seaboard Corp.	Ace Green Turf St. Augustine Weed & Feed — 0.03%	G
Penoxsulam	Gro Tec	Sta-Green Phosphorus-Free South. Weed & Feed — 0.04%	G
Penoxsulam	Knox Fert. Co.	KGRO South. Weed & Feed 30-0-3 — 0.04%	G
Penoxsulam	Turf Care Supply Corp.	Sta-Green South. Weed & Feed — 0.04%	G
Penoxsulam	Turf Care Supply Corp.	TCS GrowStar South. Penoxsulam 0.03% + Fert. — 0.03%	G
Penoxsulam	Howard Johnson's Ent.	Howard Johnson's Lockup 0.03% South. Herb. Plus — 0.03%	G
Prodiamine	Bonide Prod.	Bonide DuraTurf Crabgrass Prev. — 0.28%	G
Prodiamine	Scotts Co.	Scotts Fert. 14-0-5 w/ Halts II — 0.28%	G
Prodiamine	Scotts Co.	Scotts Fert. 24-0-8 w/ Halts II — 0.28%	G
Prodiamine	Scotts Co.	Scotts Fert. 22-0-8 w/ Halts II — 0.28%	G
Prodiamine	Scotts Co.	Scotts Fert. 14-2-5 w/ Halts II — 0.28%	G
Prodiamine	Scotts Co.	Scotts Fert. 0-0-7 w/ Halts II — 0.28%	G
Prodiamine	Loveland Prod.	Signature Evade .295% Crabgrass Prev. Plus — 0.3%	G
Prodiamine	Loveland Prod.	Signature Crabgrass Prev. w/ Barricade 0.295% Plus — 0.3%	G
Prodiamine	Loveland Prod.	Signature Evade Crabgrass Prev. .2% Plus — 0.2%	G
Prodiamine	Winfield Solutions	Groundwork Crabgrass Prev. 16-0-6 w/ 0.28% Barricade — 0.28%	G
Prodiamine	Andersons Lawn Fert. Div.	The Andersons Fert. w/ Barricade Herb. 19-0-5 — 0.21%	G
Prodiamine	Andersons Lawn Fert. Div.	Andersons Golf Prod. Fert. w/ 0.48% Barricade Herb. (5-5-30) — 0.48%	G
Prodiamine	Andersons Lawn Fert. Div.	Andersons Golf Prod. Fert. 19-0-19 w/ Barricadem Herb. — 0.48%	G
Prodiamine	Andersons Lawn Fert. Div.	The Andersons Turf Prod. Fert. w/ 0.426% Barricade Herb. 18-0-4 — 0.43%	G
Prodiamine	Andersons Lawn Fert. Div.	The Andersons Professional Turf Prod. Fert. w/ Barricade Herb. 0-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 0-0-7M — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 17-0-6 — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 0-0-8 — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 8-3-23M — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 19-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.43% + Fert. 0-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.43% + Fertilizer 19-0-7 — 0.43%	G
Prodiamine	Lesco	LESCO Barricade 0.28% + Fert. — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.2% + Fert — 0.2%	G
Prodiamine	Lesco	Stonewall 0.43% + Fert. — 0.43%	G
Prodiamine	Gro Tec	Pennington Signature Series Crabgrass Prev. + Lawn Fert. — 0.29%	G
Prodiamine	Gro Tec	Sta-Green Phosphorus Free Crab-Ex Plus w/ Lawn Fert. — 0.37%	G
Prodiamine	Voluntary Purch. Groups	Ferti-lome for All Seasons Lawn Food + Crabgrass & Weed Prev. — 0.38%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.38% — 0.38%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.3% — 0.3%	G
Prodiamine	Harrell's	Fert. w/ Ronstar 0.67% — 0.67%	G

Common chemical name	Company	Trade names and formulations	Use classification
Prodiamine	Harrell's	Fert. w/ Barricade 0.21% — 0.21%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.45% — 0.45%	G
Prodiamine	Howard Johnson's Ent.	Howard Johnson's Prem. Fert. Crabgrass Cont. Phosphate Free — 0.29%	G
Prodiamine	Howard Johnson's Ent.	Howard Johnson's Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's Ent.	HJE All Season Crabgrass Cont. Plus w/ Prodiamine — 0.29%	G
Prodiamine	Howard Johnson's Ent.	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's Ent.	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Siduron	Scotts Co.	Starter Fert. + Crabgrass Prev. 18-23-4 — 3.1%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.5% — 0.5%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.3% — 0.3%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.375% — 0.38%	G
Trifluralin	Lebanon Seaboard Corp.	Preen Gon Weed Prev. + Plant Food — 1.47%	G
Trifluralin	Lebanon Seaboard Corp.	Preen Weed Prevention w/Brilliant Blooms Fert — 1.47%	G
Trifluralin	Netafim Irrigation	Techfilter — 13.44%	G
Trifluralin	Knox Fert. Co.	KGRO Garden Weed Prev. 9-17-9 — 0.74%	G

GLOSSARY OF HERBICIDE MIXTURES

Product	Company	Use Class	Chemical Content
Herbicide Mixtures for Cropland — General Use			
4-Speed Sel. Herb.	Nufarm Americas	G	Dicamba — 2.52% + Pyraflufen-ethyl — 0.06% + 2,4-D — 38.03% + Mecoprop-P — 6.31%
4-Speed XT Sel. Herb.	Nufarm Americas	G	2,4-D — 41.92% + Pyraflufen-ethyl — 0.07% + Dicamba — 3.46% + Triclopyr — 4.81%
875 BrushKiller	PBIGordon Corp.	G	Dicamba — 4.24% + 2,4-D amine — 23.45% + MCPP-p — 12.55%
Ace Dilutable Conc. Lawn Weed Killer	Chemsico	G	Dicamba — 0.84% + 2,4-D amine — 7.59% + Mecoprop-P — 1.83%
Ace Spot Weed Killer 2	Chemsico	G	Mecoprop-P — 0.14% + 2,4-D amine — 0.59% + Dicamba — 0.07%
Alligare Cody Herb.	Alligare	G	Clopyralid — 5.1% + 2,4-D amine — 39%
Alligare Dicamba + 2,4-D DMA	Alligare	G	Dicamba — 12.5% + 2,4-D amine — 36%
Alligare MSM + Chlorsulfuron	Alligare	G	Metsulfuron-methyl — 48% + Chlorsulfuron — 15%
Alligare Prescott Herb.	Alligare	G	Triclopyr — 33% + Clopyralid — 12.1%
Andersons Golf Prod. Goosegrass/Crabgrass Control	Andersons Lawn Fert. Div.	G	Oxadiazon — 1.31% + Bensulide — 5.25%
Andersons Snapshot DG	Andersons Lawn Fert. Div.	G	Trifluralin — 2% + Isoxaben — 0.5%
Aquasweep	Nufarm Americas	G	Triclopyr — 15.2% + 2,4-D amine — 34.2%
Audit 75 WDG Herb.	Arysta Lifescience	G	Thifensulfuron methyl — 56.25% + Tribenuron-methyl — 18.75%
Authority Assist Herb.	FMC Corp.	G	Sulfentrazone — 33.33% + Imazethapyr — 6.67%
Authority First DF Herb.	FMC Corp.	G	Cloransulam-methyl — 7.9% + Sulfentrazone — 62.1%
Authority MTZ DF Herb.	FMC Corp.	G	Metribuzin — 27% + Sulfentrazone — 18%
Authority XL Herb.	FMC Corp.	G	Chlorimuron-ethyl — 7.78% + Sulfentrazone — 62.22%
Autumn Super 51 WDG Herb.	Bayer Cropscience	G	Iodosulfuron-methyl-sodium — 6% + Thiencarbazone-methyl — 45%
Avenue South Broadleaf Herb. for Turf	PBIGordon Corp.	G	Penoxsulam — 0.7% + 2,4-D amine — 4.88% + Dicamba — 2.06% + Sulfentrazone — 0.7%
Axial Star Herb.	Syngenta Crop Prot.	G	Fluroxypyr — 12.4% + Pinoxaden — 4.9%
Axial TBC Herb.	Syngenta Crop Prot.	G	Florasulam — 0.75% + Pinoxaden — 9%
Axiom DF Herb.	Bayer Cropscience	G	Metribuzin — 13.6% + Flufenacet — 54.4%
Bareground 21	Pro Serve	G	Bromacil — 1% + Borate — 40% + Diuron — 2% + Sodium chlorate — 40%

Product	Company	Use Class	Chemical Content
Barren	Total Solutions	G	Bromacil — 0.98% + 2,4-D ester — 1.09%
Basic Solutions Lawn Weed Killer 1 Conc.	Ortho Group	G	2,4-D amine — 3.6% + Mecoprop — 1.8% + Dichlorprop-P — 1.8%
Basic Solutions Lawn Weed Killer 1 RTS	Ortho Group	G	2,4-D — 3.6% + Mecoprop — 1.8% + Dichlorprop-P — 1.8%
Basic Solutions Lawn Weed Killer 1 RTU	Ortho Group	G	Dichlorprop-P — 0.16% + Mecoprop — 0.16% + 2,4-D — 0.33%
Bayer Ad. All-in-One Lawn Weed & Crabgrass Killer I Conc.	Bayer Advanced	G	Quinclorac — 0.1% + Dicamba — 0.45% + 2,4-D amine — 4.85%
Bayer Ad. All-in-One Lawn Weed & Crabgrass Killer I RTS	Bayer Advanced	G	Quinclorac — 1.61% + Dicamba — 0.45% + 2,4-D amine — 4.85%
Bayer Ad. All-in-One Lawn Weed & Crabgrass Killer RTS	Bayer Advanced	G	Dicamba — 0.45% + Quinclorac — 1.61%
Bayer Ad. All-in-One Lawn Weed & Crabgrass Killer RTU	Bayer Advanced	G	Dicamba — 0.02% + MSMA — 0.36% + Mecoprop — 0.06% + 2,4-D amine — 0.12%
Bayer Ad. All-in-One Lawn Weed and Crabgrass Killer I RTU	Bayer Advanced	G	2,4-D amine — 0.31% + Dicamba — 0.03% + Quinclorac — 0.1%
Bayer Ad. DuraZone Conc. Weed & Grass Killer	Bayer Advanced	G	Glyphosate — 20.46% + Indaziflam — 0.09% + Diquat dibromide — 0.89%
Bayer Ad. DuraZone RTU Weed & Grass Killer	Bayer Advanced	G	Diquat dibromide — 0.06% + Indaziflam — 0.01% + Glyphosate — 1.41%
Bayer Ad. Season Long Weed Control for Lawns Conc.	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Bayer Ad. Season Long Weed Control for Lawns RTS	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Bayer Ad. South. Season Long Weed Control for Lawns Conc.	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Bayer Ad. South. Season Long Weed Control for Lawns RTS	Bayer Advanced	G	2,4-D amine — 4.73% + Dicamba — 0.52% + Isoxaben — 2.63% + Mecoprop-P — 1.1%
Bayer Ad. South. Weed Killer for Lawns Conc.	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Bayer Ad. South. Weed Killer for Lawns RTS	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Bayer Ad. South. Weed Killer for Lawns RTU	Bayer Advanced	G	2,4-D amine — 0.31% + Dicamba — 0.03% + Mecoprop-P — 0.08%
Bayer Advanced Weed Killer for Lawns Conc.	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%
Bayer Advanced Weed Killer for Lawns RTS	Bayer Advanced	G	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D amine — 7.59%

Product	Company	Use Class	Chemical Content
Biathlon Ornamental Herb.	Ohp	G	Prodiamine — 0.75% + Oxyfluorfen — 2%
Blindside Herb.	FMC Corp.	G	Sulfentrazone — 60% + Metsulfuron-methyl — 6%
Bonide Chickweed Clover & Oxalis Killer	Bonide Prod.	G	MCPA — 13.72% + Dicamba — 1.35% + Tryclopyr — 1.56%
Bonide Chickweed Clover & Oxalis Killer RTU	Bonide Prod.	G	Tryclopyr — 0.08% + Dicamba — 0.07% + MCPA — 0.74%
Bonide DuraTurf Lawn Weed Killer	Bonide Prod.	G	Dicamba — 0.13% + 2,4-D amine — 1.37% + MCPP-p — 0.31%
Bonide Ground force Veg. Killer Conc.	Bonide Prod.	G	Imazapyr — 0.09% + Glyphosate — 5.03%
Bonide Ground force Veg. Killer RTU	Bonide Prod.	G	Glyphosate — 1.02% + Imazapyr — 0.02%
Bonide Poison Ivy & Brush Killer BK-32 Conc.	Bonide Prod.	G	MCPA — 13.72% + Dicamba — 1.35% + Tryclopyr — 1.56%
Bonide Poison Oak & Ivy Killer RTU	Bonide Prod.	G	Mecoprop-P — 0.14% + 2,4-D amine — 0.6% + Dicamba — 0.07%
Bonide Prozone Weed Beater Complete	Bonide Prod.	G	Prodiamine — 0.2% + Sulfentrazone — 0.1%
Bonide Sedge Ender Conc.	Bonide Prod.	G	Sulfentrazone — 1.36% + Prodiamine — 2.73%
Bonide Weed Beater Lawn Weed Killer Conc.	Bonide Prod.	G	Dicamba — 0.84% + 2,4-D amine — 7.59% + Mecoprop-P — 1.83%
Bonide Weed Beater + Crabgrass & Broadleaf Weed Killer RTS	Bonide Prod.	G	2,4-D amine — 6.42% + Dicamba — 0.6% + Quinclorac — 2.13%
Bonide Weed Beater Ultra Conc.	Bonide Prod.	G	Mecoprop-P — 6.16% + MCPA — 31.55% + Dicamba — 1.65% + Carfentrazone-ethyl — 0.22%
Bonide Weed Beater Ultra RTS	Bonide Prod.	G	Mecoprop-P — 6.16% + MCPA — 31.55% + Dicamba — 1.65% + Carfentrazone-ethyl — 0.22%
Bonide Weed Beater Ultra RTU	Bonide Prod.	G	Carfentrazone-ethyl — 0% + Dicamba — 0.02% + MCPA — 0.34% + Mecoprop-P — 0.07%
Bonus S Max South. Weed & Feed & Fire Ant Killer 1 30-2-9	Scotts Co.	G	Bifenthrin — 0.14% + Atrazine — 1.35%
Bonus S Max South. Weed & Feed & Fire Ant Killer 26-2-9	Scotts Co.	G	Atrazine — 1.07% + Bifenthrin — 0.11%
Boundary 6.5EC	Syngenta Crop Prot.	G	Metribuzin — 13.8% + S-Metolachlor — 58.2%
BP-6000	Momar	G	Dicamba — 0.62% + 2,4-D amine — 5.56% + MCPP-P — 1.34%
Brash	Winfield Solutions	G	2,4-D amine — 35.7% + Dicamba — 12.4%
Broadaxe Herb.	FMC Corp.	G	S-Metolachlor — 68.25% + Sulfentrazone — 7.55%
Broadhead Herb.	FMC Corp.	G	Quinclorac — 66.1% + Carfentrazone-ethyl — 3.9%
Bromacil/Diuron 40/40	Alligare	G	Diuron — 40% + Bromacil — 40%

Product	Company	Use Class	Chemical Content
Brushmaster Herb.	PBIGordon Corp.	G	Dicamba — 3.01% + 2,4-D ester — 18.85% + Dichloprop-p — 9.24%
Buctril 4 EC Herb.	Bayer Cropscience	G	Bromoxynil, octanoic acid ester — 28% + Bromoxynil — 27%
Caliente WDG	Sepro Corp.	G	Metsulfuron-methyl — 60% + Pyraflufen-ethyl — 6%
Camix Sel. Herb.	Syngenta Crop Prot.	G	Mesotrione — 3.68% + S-Metolachlor — 36.8%
Campaign Herb.	Monsanto Co.	G	Glyphosate — 12.9% + 2,4-D amine — 20.6%
Candor Herb.	Nufarm Americas	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Capreno Herb.	Bayer Cropscience	G	Thiencarbazone-methyl — 5.6% + Tembotrione — 28.3%
Capstone	Dow Agrosciences	G	Triclopyr — 16.22% + Aminopyralid — 2.22%
Catamaran	Luxembourg-pamol	G	Phosphorous acid — 38.9% + Chlorothalonil — 16.7%
Cavalcade PQ	Advan	G	Quinclorac — 32.5% + Prodiamine — 32.5%
Caveat Herb.	Agsurf Corp.	G	Nicosulfuron — 50% + Rimsulfuron — 25%
Cedock Herb.	Agsurf Corp.	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
Celsius WG Herb.	Bayer Env. Science	G	Iodosulfuron-methyl-sodium — 1.9% + Thiencarbazone-methyl — 8.7% + Dicamba — 57.4%
Chaparral	Dow Agrosciences	G	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%
Chaser 2 Amine	Loveland Prod.	G	Triclopyr — 15.2% + 2,4-D amine — 34.2%
Chaser Turf Herb.	Loveland Prod.	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Chisum Herb.	Cheminova	G	Chlorsulfuron — 15% + Metsulfuron-methyl — 48%
Chlormet Herb.	Agsurf Corp.	G	Chlorsulfuron — 62.5% + Metsulfuron-methyl — 12.5%
Chlormet XP Herb.	Agsurf Corp.	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%
Cleansweep D Herb.	Nufarm	G	Bromoxynil octonoate — 24.01% + 2,4-D ester — 31.22% + Fluroxypyr — 9.5%
Clear Choice	Petro-Canada Lubricants	G	Dicamba — 0% + 2,4-D amine — 0.03% + Mecoprop — 0.02%
Clear Choice Conc.	Petro-Canada Lubricants	G	2,4-D amine — 0.03% + Dicamba — 0% + Mecoprop-P — 0.02%
Clearpath Herb.	BASF Corp.	G	Imazethapyr — 13.02% + Quinclorac — 61.98%
Cloak EX Herb.	Nufarm	G	Chlorimuron-ethyl — 22.7% + Tribenuron-methyl — 6.8%
Cloak Herb.	Nufarm	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
Confront	Dow Agrosciences	G	Clopyralid — 12.1% + Triclopyr — 33%
Consust WDG T&O Fung.	Regal Chem. Co.	G	Thiophanate-methyl — 16.66% + Chlorothalonil — 50%
Cool Power Sel. Herb.	Nufarm Americas	G	MCPA — 56.14% + Dicamba — 3.6% + Triclopyr — 5%

Product	Company	Use Class	Chemical Content
CRAB-E-RAD PLUS	Lawn and Garden Prod.	G	Quinclorac — 4.09% + 2,4-D — 6.56% + Dicamba — 0.68%
CRAB-E-RAD PLUS RTU	Lawn and Garden Prod.	G	Dicamba — 0.03% + 2,4-D amine — 0.33% + Quinclorac — 0.21%
Credit Xtreme Herb.	Nufarm	G	Potassium salt of glyphosate — 22.99% + Glyphosate — 30.94%
Crossbow	Dow Agrosciences	G	Triclopyr — 16.5% + 2,4-D ester — 34.4%
Crossbow	Helena Chem. Co	G	2,4-D amine — 34.4% + Triclopyr — 16.5%
Crossbow	South. Ag. Insecticides	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Crossbow	Universal Crop Prot. Alliance	G	Triclopyr — 16.5% 2,4-D amine — 34.4%
Crossbow Herb.	Tenkoz	G	Tryclopyr — 16.5% + 2,4-D ester — 34.4%
Crossbow L Herb.	Loveland Prod.	G	Triclopyr — 16.5% + 2,4-D ester — 34.4%
Dibro 2+2	Nufarm Americas	G	Bromacil — 2% + Diuron — 2%
Dibro 4+2	Nufarm Americas	G	Bromacil — 2% + Diuron — 4%
Dicamba + 2,4-D	Tacoma Ag	G	Dicamba — 12.5% + 2,4-D amine — 36%
Dismiss South Herb.	FMC Corp.	G	Sulfentrazone — 33.33% + Imazethapyr — 6.67%
Distinct Herb.	BASF Corp.	G	Dicamba — 55% + Diflufenzopyr-sodium — 21.4%
Do it Best Lawn Weed Control Conc.	Maid Brands	G	2,4-D amine — 5.56% + MCPP, DMA salt — 1.34% + Dicamba — 0.62%
Do it Best Spot Weed Killer RTU	Maid Brands	G	Mecoprop — 0.14% + 2,4-D amine — 0.6%
Domain DF Herb.	Bayer Cropscience	G	Flufenacet — 24% + Metribuzin — 36%
Doom Weed Killer Spray	QuestVapco Corp.	G	2,4-D amine — 0.29% + Bromacil — 0.5%
Duet	RiceCo.	G	Bensulfuron-methyl — 0.32% + Propanil — 41.2%
Duet 60 DF	RiceCo.	G	Bensulfuron-methyl — 0.46% + Propanil — 60%
DuPont Basis Herb.	DuPont	G	Thifensulfuron methyl — 25% + Rimsulfuron — 50%
DuPont Canopy Herb.	DuPont	G	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%
DuPont Cimarron Max Herb.	DuPont	G	2,4-D amine — 35.25% + Dicamba — 12.25% + Metsulfuron-methyl — 0.75%
DuPont Cimarron Max Part B Herb.	DuPont	G	Dicamba — 12.4% + 2,4-D amine — 35.7%
DuPont Cimarron Plus Herb.	DuPont	G	Metsulfuron-methyl — 48% + Chlorsulfuron — 15%
DuPont Enlite Herb.	DuPont	G	Flumioxazin — 36.21% + Thifensulfuron methyl — 8.8%
DuPont Enlite Herb.	DuPont	G	Chlorimuron-ethyl — 2.85% + Chlorimuron-ethyl — 9.2%
DuPont Envive Herb.	DuPont	G	Thifensulfuron methyl — 2.9% + Flumioxazin — 29.2%
DuPont Finesse Cereal and Fallow Herb.	DuPont	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%

Product	Company	Use Class	Chemical Content
DuPont Finesse Grass & Broadleaf Herb.	DuPont	G	Chlorsulfuron — 25% + Flucarbazone-sodium — 46.7%
DuPont Finesse Herb.	DuPont	G	Chlorsulfuron — 62.5% + Metsulfuron-methyl — 12.5%
DuPont FirstShot SG Burndown Herb. (w/ TotalSol sol. gran.)	DuPont	G	Thifensulfuron methyl — 25% + Tribenuron-methyl — 25%
DuPont Harmony Extra Herb. (w/ TotalSol sol. gran.)	DuPont	G	Thifensulfuron methyl — 33.33% + Tribenuron-methyl — 16.67%
DuPont Harmony Extra SG Herb. (w/ TotalSol sol. gran.)	DuPont	G	Thifensulfuron methyl — 33.33% + Tribenuron-methyl — 16.67%
DuPont Harmony Extra XP Herb.	DuPont	G	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%
DuPont Krovar I DF Herb.	DuPont	G	Diuron — 40% + Bromacil — 40%
DuPont Lineage Clearstand Herb.	DuPont	G	Metsulfuron-methyl — 9.5% + Imazapyr — 63.2%
DuPont Lineage HWC Herb.	DuPont	G	Imazapyr — 37.5% + Sulfometuron methyl — 28.1% + Metsulfuron-methyl — 7.5%
DuPont Lineage Prep Herb.	DuPont	G	Imazapyr — 54.5% + Metsulfuron-methyl — 4.1% + Sulfometuron methyl — 15.3%
DuPont Oust Extra Herb.	DuPont	G	Sulfometuron methyl — 56.25% + Metsulfuron-methyl — 15%
DuPont Oustar Herb.	DuPont	G	Sulfometuron methyl — 11.8% + Hexazinone — 63.2%
DuPont Pastora Herb.	DuPont	G	Metsulfuron-methyl — 15% + Nicosulfuron — 56.2%
DuPont Perspective Herb.	DuPont	G	Aminocyclopyrachlor — 39.5% + Chlorsulfuron — 15.8%
DuPont Realm Q Herb.	DuPont	G	Mesotrione — 31.25% + Rimsulfuron — 7.5%
DuPont Require Q (mp) Herb.	DuPont	G	Rimsulfuron — 6.25% + Dicamba — 52.94% + Thifensulfuron methyl — 4% + Rimsulfuron — 18.4%
DuPont Resolve Q Herb.	DuPont	G	Rimsulfuron — 18.4% + Thifensulfuron methyl — 4%
DuPont Steadfast Herb.	DuPont	G	Nicosulfuron — 50% + Rimsulfuron — 25%
DuPont Steadfast Q Herb.	DuPont	G	Rimsulfuron — 12.5% + Nicosulfuron — 25.2%
DuPont Stout (mp) Herb.	DuPont	G	Thifensulfuron methyl — 5% + Nicosulfuron — 67.5%
DuPont Stout Herb.	DuPont	G	Thifensulfuron methyl — 5% + Nicosulfuron — 67.5%
DuPont Streamline Herb.	DuPont	G	Aminocyclopyrachlor — 39.5% + Metsulfuron-methyl — 12.6%
DuPont Synchrony STS Herb.	DuPont	G	Chlorimuron-ethyl — 31.8% + Thifensulfuron methyl — 10.2%
DuPont Synchrony STS SP Herb.	DuPont	G	Thifensulfuron methyl — 10.2% + Chlorimuron-ethyl — 31.8%
DuPont Throttle XP Herb.	DuPont	G	Sulfometuron methyl — 18% + Chlorsulfuron — 9% + Sulfentrazone — 48%
DuPont Viewpoint Herb.	DuPont	G	Metsulfuron-methyl — 7.3% + Imazapyr — 31.6% + Aminocyclopyrachlor — 22.8%
DuPont Basis Blend Herb.	DuPont	G	Rimsulfuron — 20% + Thifensulfuron methyl — 10%
DuPont Canopy EX Herb.	DuPont	G	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%

Product	Company	Use Class	Chemical Content
DuPont Landmark II XP Herb.	DuPont	G	Chlorsulfuron — 18.75% + Sulfometuron methyl — 56.25%
DuPont Landmark XP Herb.	DuPont	G	Sulfometuron methyl — 50% + Chlorsulfuron — 25%
DuPont LeadOff Herb.	DuPont	G	Thifensulfuron methyl — 16.7% + Rimsulfuron — 16.7%
DuPont Synchrony XP (mp) Herb.	DuPont	G	Thifensulfuron methyl — 6.9% + Chlorimuron-ethyl — 21.5%
DuPont Synchrony XP Herb.	DuPont	G	Chlorimuron-ethyl — 21.5% + Thifensulfuron methyl — 6.9%
DuPont Westar Herb.	DuPont	G	Hexazinone — 68.6% + Sulfometuron methyl — 6.5%
E-2 Herb.	Nufarm Americas	G	Fluroxypyr — 5.9% + Dicamba — 4.1% + 2,4-D — 39.53%
Echelon 4SC Herb.	FMC Corp.	G	Prodiamine — 27.3% + Sulfentrazone — 13.6%
Endrun	Helena Chem. Co	G	MCPP, DMA salt — 8.17% + 2,4-D amine — 30.56% + Dicamba — 2.77%
Enforcer Weed Shot Lawn Weed Killer Conc.	Zep Com. Sales & Service	G	Mecoprop-P — 1.34% + 2,4-D amine — 5.56% + Dicamba — 0.62%
Escalade 2	Nufarm Americas	G	Fluroxypyr — 5.9% + Dicamba — 4.1% + 2,4-D — 39.53%
Everett	Alligare	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Exceed Custom-Pak	Syngenta Crop Prot.	G	Primisulfuron-methyl — 28.5% + Prosulfuron — 28.5%
Expert Gardener Weed & Feed 28-3-3, 28-0-3	Scotts Co.	G	Dichlorprop-P — 0.09% + 2,4-D amine — 0.72% + Mecoprop-P — 0.15%
Expert Gardener Wint. Weed & Feed 22-3-11	Scotts Co.	G	Dichlorprop-P — 0.09% + 2,4-D amine — 0.72% + Mecoprop-P — 0.15%
Extreme Herb.	BASF Corp.	G	Glyphosate — 22% + Imazethapyr — 1.8%
FallOut Herb.	Agsurf Corp.	G	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%
Ferti-lome Double Play RTU	Voluntary Purch. Groups	G	Prodiamine — 0.5% + Glyphosate — 2%
Ferti-lome Double Play Weeds ‘em Out Keeps ‘em Out	Voluntary Purch. Groups	G	Glyphosate — 40.15% + Prodiamine — 7.51%
Ferti-lome Weed Free Zone	Voluntary Purch. Groups	G	2,4-D ester — 10.49% + Dicamba — 0.67% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66%
Ferti-lome Weed Free Zone RTS	Voluntary Purch. Groups	G	2,4-D ester — 10.49% + Dicamba — 0.67% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66%
Ferti-lome Weed Free Zone RTU	Voluntary Purch. Groups	G	Mecoprop-P — 0.07% + Carfentrazone-ethyl — 0% + Dicamba — 0.02% + MCPA — 0.34%
Ferti-lome Weed Out Broadleaf Weed Control	Voluntary Purch. Groups	G	Dicamba — 0.18% + MCPP-P — 0.4% + 2,4-D amine — 1.65%
Ferti-lome Weed Out Lawn Weed Killer	Voluntary Purch. Groups	G	2,4-D amine — 5.88% + Dichlorprop-p — 5.45% + Dicamba — 1.21%

Product	Company	Use Class	Chemical Content
Ferti-lome Weed Out Lawn Weed Killer RTU	Voluntary Purch. Groups	G	Dicamba — 0.07% + 2,4-D amine — 0.6% + Mecoprop-P — 0.14%
Ferti-lome Weed Out w/ Q	Voluntary Purch. Groups	G	2,4-D amine — 6.42% + Dicamba — 0.6% + Quinclorac — 2.13%
Ferti-lome Weed Out w/ Q RTS	Voluntary Purch. Groups	G	2,4-D amine — 6.42% + Dicamba — 0.6% + Quinclorac — 2.13%
Ferti-lome Weed Out w/ Q RTU	Voluntary Purch. Groups	G	Quinclorac — 0.1% + Dicamba — 0.03% + 2,4-D amine — 0.31%
Fierce Herb.	Valent U.S.A. Corp.	G	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%
FirstStep	Dow Agrosciences	G	Florasulam — 4.84% + Glyphosate — 50.2%
Flexstar GT 3.5	Syngenta Crop Prot.	G	Fomesafen — 5.88% + Glyphosate — 22.4%
Flexstar GT Herb.	Syngenta Crop Prot.	G	Glyphosate — 25.6% + Fomesafen — 6.72%
FM 5050-ES Weed Zapper	Delta Foremost Chem. Corp.	G	Bromacil — 1% + Petroleum distillate, oils, solvent, or hydrocarbons; also paraffinic hydrocarbons, aliphatic hydrocarbons, paraffinic oil — 85.45%
ForeFront HL	Dow Agrosciences	G	2,4-D amine — 41.26% + Aminopyralid — 8.24%
ForeFront R&P	Dow Agrosciences	G	2,4-D amine — 51.06% + Aminopyralid — 6.58%
Fortify Crabgrass Prev. w/ Team Herb.	Andersons Lawn Fert. Div.	G	Trifluralin — 0.67% + Benefin — 1.33%
Freehand 1.75G Herb.	BASF Corp.	G	Pendimethalin — 1% + Dimethenamide-P — 0.75%
Frontrow	Dow Agrosciences	G	Flumetsulam — 80% + Cloransulam-methyl — 84%
FUSION Herb.	Syngenta Crop Prot.	G	Fenoxaprop-p-ethyl — 6.76% + Fluazifop-P-butyl — 24.15%
GF-2727	Dow Agrosciences	G	Glyphosate — 22.1% + 2,4-D amine — 24.4%
Gordon's All-Season Brush No-More	PBIGordon Corp.	G	Dicamba — 1.65% + 2,4-D ester — 9.74% + Dichloprop-p — 4.78%
Gordon's Barrier Year-long Veg. Killer Conc.	PBIGordon Corp.	G	Glyphosate — 3.82% + Imazapyr — 1.74%
Gordon's Brush Killer	PBIGordon Corp.	G	2,4-D amine — 25.93% + MCPP-p — 6.93% + Dicamba — 2.76%
Gordon's Cleanout Brush & Stump Spray	PBIGordon Corp.	G	Dichloprop-p — 4.78% + 2,4-D ester — 9.74% + Dicamba — 1.65%
Gordon's Hi-Dep Broadleaf Herb.	PBIGordon Corp.	G	2,4-D amine — 33.2% + 2,4-D amine — 16.3%
Gordon's Pasture Pro Brush Killer for Hard-to-Kill Brush	PBIGordon Corp.	G	Dicamba — 1.22% + 2,4-D ester — 15.97% + Triclopyr — 8.4%
Gordon's Pasture Pro Herb.	PBIGordon Corp.	G	2,4-D amine — 33.2% + 2,4-D amine — 16.3%
Gordon's Pronto Fast Acting Veg. Killer	PBIGordon Corp.	G	Glyphosate — 3.82% + Imazapyr — 1.74%
Gordon's Pronto Fast Acting Veg. Killer RTU	PBIGordon Corp.	G	Imazapyr — 0.27% + Glyphosate — 0.58%

Product	Company	Use Class	Chemical Content
Gordon's Speed Zone Lawn Weed Killer	PBIGordon Corp.	G	Dicamba — 1.71% + 2,4-D ester — 28.57% + Carfentrazone-ethyl — 0.62% + MCPP-p — 5.88%
Gordon's Speed Zone RTU Lawn Weed Killer	PBIGordon Corp.	G	MCPP-p — 0.07% + Carfentrazone-ethyl — 0% + MCPA — 0.34% + Dicamba — 0.02%
Gordon's Trimec Crabgrass + Lawn Weed Killer Conc.	PBIGordon Corp.	G	Dicamba — 0.6% + 2,4-D amine — 6.42% + Quinclorac — 2.13%
Gordon's Trimec Crabgrass + Lawn Weed Killer Ready Spray	PBIGordon Corp.	G	Dicamba — 0.6% + 2,4-D amine — 6.42% + Quinclorac — 2.13%
Gordon's Trimec Crabgrass + Lawn Weed Killer RTU	PBIGordon Corp.	G	Quinclorac — 0.1% + 2,4-D amine — 0.31% + Dicamba — 0.03%
Gordon's Trimec Lawn Weed Killer	PBIGordon Corp.	G	MCPP-p — 1.83% + 2,4-D amine — 7.59% + Dicamba — 0.84%
Gordon's Trimec Nutsedge + Lawn Weed Killer Conc.	PBIGordon Corp.	G	Sulfentrazone — 0.15% + MCPP-p — 2.2% + 2,4-D amine — 6.1% + Dicamba — 0.57%
Gordon's Trimec Ready Spray Lawn Weed Killer	PBIGordon Corp.	G	MCPP-p — 1.34% + Dicamba — 0.62% + 2,4-D amine — 5.56%
Grasp Xtra	Dow Agrosciences	G	Penoxsulam — 2.77% + Triclopyr — 23.06%
GrazonNext	Dow Agrosciences	G	Aminopyralid — 6.58% + 2,4-D amine — 51.06%
GrazonNext HL	Dow Agrosciences	G	Aminopyralid — 8.24% + 2,4-D amine — 41.26%
Green Light Amaze Grass & Weed Prev. 2	Green Light Co.	G	Oryzalin — 1% + Benefin — 1%
Green Light Wipe-Out Broadleaf Weed Killer 2 RTS	Green Light Co.	G	Dicamba — 0.81% + Dichlorprop-p — 3.33% + 2,4-D amine — 1.91%
GroundWork Conc. Poison Ivy & Brush Killer	PBIGordon Corp.	G	MCPP-p — 2.92% + Dicamba — 1.34% + 2,4-D amine — 12.1%
GroundWork Conc. Weed Killer	PBIGordon Corp.	G	2,4-D amine — 7.59% + Dicamba — 0.84% + MCPP-p — 1.83%
GroundWork Conc. Year-Long Veg. Control	PBIGordon Corp.	G	Imazapyr — 0.27% + Glyphosate — 0.58%
Halex GT	Syngenta Crop Prot.	G	S-Metolachlor — 20.5% + Mesotrione — 2.05% + Glyphosate — 20.5%
Harmony Extra Herb.	DuPont	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Harrell's Granular Herb. 75	Harrell's	G	Oxyfluorfen — 2% + Trifluralin — 3%
Hi-Yield Crabgrass Control	Voluntary Purch. Groups	G	Trifluralin — 0.67% + Benefin — 1.33%
Hi-Yield Killzall Ext. Control	Voluntary Purch. Groups	G	Prodiamine — 7.51% + Glyphosate — 40.15%
Hi-Yield Killzall Ext. Control RTU	Voluntary Purch. Groups	G	Glyphosate — 2% + Prodiamine — 0.5%
Hornet	Dow Agrosciences	G	Clopyralid — 62.5% + Flumetsulam — 23.1%
Hornet WDG	Dow Agrosciences	G	Clopyralid — 60% + Flumetsulam — 18.5%

Product	Company	Use Class	Chemical Content
Horsepower Sel. Herb.	Nufarm Americas	G	Dicamba — 4.82% + MCPA — 48.99% + Triclopyr — 5.59%
Huskie Herb.	Bayer Cropscience	G	Bromoxynil heptanoate — 12.9% + Bromoxynil octanoate — 13.4% + Pyrasulfotole Technical — 3.3%
Image Herb. Kills Crabgrass II	Ambrands	G	Quinclorac — 56.25% + Sulfentrazone — 18.75%
Intimidator	Loveland Prod.	G	S-Metolachlor — 36.29% + Metribuzin — 8.05% + Fomesafen — 7.16%
Jewel Pre-emergent Herb.	Everris NA/ Scotts Sierra Crop Prot.	G	Oxadiazon — 2% + Pendimethalin — 1.25%
Journey Herb.	BASF Corp.	G	Imazapic — 8.13% + Glyphosate — 21.94%
Kgro Broadleaf Weed Killer 1 Conc.	Swiss Farms Prod.	G	Mecoprop-P — 5.3% + 2,4-D — 3.05% + Dicamba — 1.3%
Kgro Lawn Weed Killer RTU	Swiss Farms Prod.	G	2,4-D — 0.33% + Dichlorprop-P — 0.16% + Mecoprop-P — 0.16%
Knock Out II	Aero Chem. Co	G	Bromacil — 0.98% + 2,4-D ester — 1.09%
Knock Out Non-Sel. Weed Killer	Aero Chem. Co	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Latigo	Helena Chem. Co	G	Dicamba — 18.28% + 2,4-D amine — 24.62%
Lawn Weed Control	Scotts Co.	G	2-4,D — 2.95% + Dicamba — 0.48%
Layby Pro	Tessenderlo Kerley	G	Diuron — 20% + Linuron — 20.3%
Ledger Herb.	Tenkoz	G	S-Metolachlor — 58.2% + Metribuzin — 13.8%
Lesco Eliminate Liq. Herb.	Lesco	G	MCPA — 48.99% + Dicamba — 4.82% + Triclopyr — 5.59%
Lesco Eliminate LO Herb.	Lesco	G	2,4-D — 47.33% + Dicamba — 2.3% + Mecoprop-P — 8.17%
Lesco Eliminate-D Herb.	Lesco	G	Dimethoxane — 2.64% + 2,4-D amine — 6.61% + MCPA — 9.97%
Lesco Momentum FX2 Herb.	Lesco	G	Fluroxypyr — 4.2% + 2,4-D — 44.2% + Triclopyr — 3.86%
Lesco Momentum Q Herb.	Nufarm Americas	G	Dicamba — 1.38% + 2,4-D — 13.24% + Quinclorac — 8.25%
Lesco RedZone 2 Herb.	Nufarm Americas	G	Dicamba — 2.52% + Pyraflufen-ethyl — 0.06% + 2,4-D — 38.03% + Mecoprop-P — 6.31%
Lesco Stonewall PQ Herb.	Advan	G	Prodiamine — 32.5% + Quinclorac — 32.5%
Lesco Three-Way Ester ll Herb.	Lesco	G	Triclopyr — 5% + Dicamba — 3.6% + MCPA — 56.14%
Lesco Three-Way Sel. Herb.	Lesco	G	Mecoprop — 8.17% + 2,4-D amine — 30.56% + Dicamba — 2.77%
Liberator 531	Atco International	G	2,4-D amine — 0.6% + Dicamba — 0.25% + MCPP-p — 1.04%

Product	Company	Use Class	Chemical Content
Liberator 600	Atco International	G	Bromacil — 0.98% + 2,4-D ester — 1.09%
Liq. Turf Builder w/ Plus 2 Weed Control 25-1-2, 25-0-2	Scotts Co.	G	Mecoprop-P — 1.15% + 2,4-D amine — 2.29% + Dichlorprop — 1.13%
Makaze Yield Pro	Loveland Prod.	G	IBA — 0.5% + Glyphosate — 41% + Cytokinin (as kinetin) — 0.01%
Matador	Loveland Prod.	G	Metribuzin — 6.14% + Metolachlor — 43.72% + Imazethapyr — 1.38%
Mec Amine-D	Loveland Prod.	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + Mecoprop-P — 8.17%
Milestone VM Plus	Dow Agrosciences	G	Triclopyr — 16.22% + Aminopyralid — 2.22%
Millennium Ultra 2	Nufarm Americas	G	Clopyralid — 2.54% + Dicamba — 4.65% + 2,4-D — 37.32%
Misty 2 Plus 2	Amrep	G	Diuron — 2% + Bromacil — 2%
Misty Repco Kill III	Amrep	G	2,4-D ester — 1.09% + Bromacil — 0.98%
Misty Repco Kill LF	Amrep	G	Bromacil — 0.61% + 2,4-D ester — 1.09%
Mojave 70 EG	Alligare	G	Imazapyr — 7.78% + Diuron — 62.22%
Monobor Chlorate	Pro Serve	G	Borate — 48.5% + Sodium chlorate — 30%
Nautique	Sepro Corp.	G	Copper triethanolamine complex — 14.9% + Copper ethylenediamine complex — 13.2%
Nimble Herb.	Cheminova	G	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%
Northstar Custompak	Syngenta Crop Prot.	G	Primisulfuron-methyl — 7.5% + Dicamba — 43.9%
Nufarm Credit Extra	Nufarm	G	Glyphosate, ammonium salt — 17.86% + Glyphosate — 16.26%
Nufarm Double O SPC Herb.	Nufarm Americas	G	Oxyfluorfen — 2% + Oryzalin — 1%
Nufarm Imazuron Herb.	Nufarm Americas	G	Diuron — 62.22% + Imazapyr — 7.78%
Obey Herb.	FMC Corp.	G	Clomazone — 13.2% + Quinclorac — 13.2%
OH 2 Ornamental Herb.	Scotts Co.	G	Pendimethalin — 1% + Oxyfluorfen — 2%
OH2	Everris NA/ Scotts Sierra Crop Prot.	G	Pendimethalin — 1% + Oxyfluorfen — 2%
Olympus Flex Herb.	Bayer Cropscience	G	Mesosulfuron-methyl — 4.5% + Propoxycarbazone-sodium — 6.75%
One Step	Momar	G	2,4-D amine — 1.09% + Bromacil — 0.98%
Onetime Herb.	BASF Corp.	G	Dicamba — 2.13% + Mecoprop — 7.98% + Quinclorac — 15.95%
Opensight	Dow Agrosciences	G	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%
Optill Powered by Kixor Herb.	BASF Corp.	G	Saflufenacil — 17.8% + Imazethapyr — 50.2%
Optill PRO powered by Kixor Herb.	BASF Corp.	G	Imazethapyr — 50.2% + Saflufenacil — 17.8% + Dimethenamide-P — 63.9%
Orion Herb.	Syngenta Crop Prot.	G	Florasulam — 0.39% + MCPA — 42.25%

Product	Company	Use Class	Chemical Content
Ortho Groundclear Complete Veg. Killer Conc.	Ortho Group	G	Glyphosate — 5% + Imazapyr — 0.08%
Ortho Groundclear Complete Veg. Killer RTU	Ortho Group	G	Imazapyr — 0.02% + Glyphosate — 1%
Ortho Groundclear Superedger Plus RTU	Ortho Group	G	Oxyfluorfen — 0.25% + Glyphosate — 0.25%
Ortho Groundclear Veg. Killer Conc.	Ortho Group	G	Glyphosate — 5% + Imazapyr — 0.08%
Ortho GroundClear Veg. Killer RTU1	Ortho Group	G	Glyphosate — 5% + Imazapyr — 0.08%
Ortho Groundclear Veg. Killer RTU	Ortho Group	G	Imazapyr — 0.02% + Glyphosate — 1%
Ortho Season Long MAX Weed & Grass Killer	Ortho Group	G	Oxyfluorfen — 0.25% + Glyphosate — 0.25%
Ortho Season Long MAX Weed & Grass Killer + Prev. Conc.	Ortho Group	G	Glyphosate — 8% + Oxyfluorfen — 1.5% + Diquat dibromide — 0.1%
Ortho Season Long MAX Weed & Grass Killer Ready Spray II	Ortho Group	G	Diquat dibromide — 0.1% + Oxyfluorfen — 1.5% + Glyphosate — 8%
Ortho Season Long MAX Weed & Grass Killer RTU w/ Prev.	Ortho Group	G	Oxyfluorfen — 0.25% + Glyphosate — 0.25%
Ortho Weed B Gon Conc.	Ortho Group	G	Dicamba — 1.3% + 2,4-D amine — 3.05% + Mecoprop-P — 5.3%
Ortho Weed B Gon Conc. for South. Lawns	Ortho Group	G	Dicamba — 1.3% + 2,4-D amine — 3.05% + Mecoprop-P — 5.3%
Ortho Weed B Gon Lawn Weed Killer Pull ‘N Spray	Ortho Group	G	Mecoprop — 6.04% + 2,4-D — 5.64%
Ortho Weed B Gon MAX	Ortho Group	G	Dicamba — 0.05% + 2,4-D amine — 0.12% + Mecoprop — 0.22%
Ortho Weed B Gon MAX Conc.	Ortho Group	G	Dicamba — 1.35% + 2,4-D — 13.72% + Tryclopyr — 1.56%
Ortho Weed B Gon MAX Conc. + Crabgrass Control	Ortho Group	G	Dicamba — 0.6% + 2,4-D — 6.42% + Quinclorac — 2.13%
Ortho Weed B Gon MAX Conc. + Crabgrass Control Singles	Ortho Group	G	Dicamba — 0.6% + 2,4-D — 6.42% + Quinclorac — 2.13%
Ortho Weed B Gon MAX Conc. Singles	Ortho Group	G	Dicamba — 1.3% + 2,4-D amine — 3.05% + Mecoprop-P — 5.3%
Ortho Weed B Gon MAX for South. Lawns Conc.	Ortho Group	G	Carfentrazone-ethyl — 0.16% + Dicamba — 0.27% + 2,4-D — 4.01% + Mecoprop-P — 0.49%
Ortho Weed B Gon MAX for South. Lawns RTS	Ortho Group	G	Carfentrazone-ethyl — 0.16% + 2,4-D, ethyl ester — 4.01% + Dicamba — 0.27% + Mecoprop-P — 0.49%
Ortho Weed B Gon MAX for South. Lawns RTU	Ortho Group	G	Mecoprop-P — 0.02% + Dicamba — 0.01% + 2,4-D, ethyl ester — 0.18% + Carfentrazone-ethyl — 0.01%
Ortho Weed B Gon MAX + Crabgrass Control	Ortho Group	G	2,4-D amine — 0.12% + Dicamba — 0.05% + Mecoprop-P — 0.22% + Quinclorac — 0.1%
Ortho Weed B Gon MAX + Crabgrass Control RTS	Ortho Group	G	Dicamba — 0.6% + 2,4-D — 6.42%

Product	Company	Use Class	Chemical Content
			+ Quinclorac — 2.13%
Ortho Weed B Gon MAX Ready Spray	Ortho Group	G	Dicamba — 1.35% + MCPA — 13.72% + Tryclopyr — 1.56%
Ortho Weed B Gon MAX RTU	Ortho Group	G	Dicamba — 0.05% + 2,4-D — 0.12% + Mecoprop-P — 0.22%
Ortho Weed B Gon Pro	Nufarm Americas	G	Mecoprop-P — 8.17% + 2,4-D — 33.83% + Dicamba — 3.73%
Ortho Weed B Gon Pro South.	Nufarm Americas	G	Dicamba — 3.97% + MCPA — 40.42% + Mecoprop-P — 7.99%
Ortho Weed B Gon Ready Spray	Ortho Group	G	Mecoprop-P — 5.3% + 2,4-D amine — 3.05% + Dicamba — 1.3%
Ortho Weed B Gon Ready Spray for South. Lawns	Ortho Group	G	Mecoprop-P — 5.3% + 2,4-D amine — 3.05% + Dicamba — 1.3%
Ortho Weed B Gon RTU	Ortho Group	G	Dicamba — 0.05% + 2,4-D amine — 0.12% + Mecoprop — 0.22%
Ortho Weed B Gon Weed Killer for Lawns	Ortho Group	G	Dicamba — 0.05% + 2,4-D amine — 0.12% + Mecoprop-P — 0.22%
Ortho Weed B Gon Weed Killer for Lawns Conc.	Ortho Group	G	Dicamba — 1.35% + MCPA — 13.72% + Tryclopyr — 1.56%
Ortho Weed B Gon Weed Killer for Lawns RTS	Ortho Group	G	Dicamba — 1.35% + MCPA — 13.72% + Tryclopyr — 1.56%
Outlaw	Helena Chem. Co	G	2,4-D amine — 24.28% + Dicamba — 12.18%
Overdrive Herb.	BASF Corp.	G	Dicamba — 55% + Diflufenzopyr — 21.4%
PastureGard	Dow Agrosciences	G	Triclopyr — 25% + Fluroxypyr — 8.6%
PastureGard HL	Dow Agrosciences	G	Triclopyr — 45.07% + Fluroxypyr — 15.56%
Pasturemaster Herb.	Nufarm	G	Dicamba — 12.82% + 2,4-D amine — 24.58%
Pathway	Dow Agrosciences	G	2,4-D amine — 20.9% + Picloram — 5.4%
Patron170	Nufarm Americas	G	2,4-DP-p — 16.1% + 2,4-D amine — 32.1%
Pennington Lawn Weed Killer	Gro Tec	G	2,4-D — 0.43% + Dichlorprop — 0.21% + Mecoprop — 0.21%
Permit Plus Herb.	Gowan Co.	G	Thifensulfuron methyl — 7.78% + Halosulfuron-methyl — 66.2%
Piper Herb.	Valent U.S.A. Corp.	G	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%
Power Zone Broadleaf Herb. for Turf	PBIGordon Corp.	G	MCPP-p — 5.39% + Carfentrazone-ethyl — 0.48% + MCPA — 41.98% + Dicamba — 2.69%
Pramitol 5PS	Makhteshim-Agan	G	Borate — 40.78% + Sodium chlorate — 39.8% + Prometon — 5%
Pramitol 5PS	Universal Crop Prot. Alliance	G	Borate — 40% + Simazine — 0.76%

Product	Company	Use Class	Chemical Content
			+ Prometon — 5% + Sodium chlorate — 39.8%
Pramitol 5PS Pelleted Herb.	Loveland Prod.	G	Borate — 40.78% + Prometon — 5% + Sodium chlorate — 39.8%
Preen Lawn Broadleaf Weed Control	Lebanon Seaboard Corp.	G	2,4-D amine — 1.37% + Dicamba — 0.13% + Mecoprop-P — 0.31%
Preen Weed Control	Lebanon Seaboard Corp.	G	Dicamba — 0.13% + 2,4-D amine — 1.37% + MCPP — 0.31%
Prefix Herb.	Syngenta Crop Prot.	G	Fomesafen — 10.2% + S-Metolachlor — 46.4%
Prep-It Herb.	Loveland Prod.	G	Imazapyr — 8.36% + Glyphosate — 22.13%
Primera Millennium Ultra 2	Nufarm Americas	G	Clopyralid — 2.54% + Dicamba — 4.65% + 2,4-D — 37.32%
Primera Triplet Low Odor	Nufarm Americas	G	2,4-D — 47.33% + Dicamba — 2.3% + Mecoprop-P — 8.17%
Primera Triplet SF	Nufarm Americas	G	2,4-D — 30.56% + Dicamba — 2.77% + Mecoprop-P — 8.17%
PrimeraOne OB-2G	Farmsaver.com	G	Oryzalin — 1% + Benefin — 1%
PrimeraOne OB-2G	Makhteshim-Agan	G	Oryzalin — 1% + Benefin — 1%
PrimeraOne PrimeTime	Nufarm Americas	G	2,4-D — 33.3% + Dichlorprop-P — 8.45% + Mecoprop-P — 8.58%
ProDeuce	Nufarm Americas	G	Glyphosate — 40.15% + Prodiamine — 7.51%
Progeny Herb.	Nufarm Americas	G	Triclopyr — 5% + Dicamba — 3.6% + MCPA — 51.46%
Pronto Veg. Killer	PBIGordon Corp.	G	Imazapyr — 1.74% + Glyphosate — 3.82%
Pulsar Herb.	Syngenta Crop Prot.	G	Dicamba — 12% + Fluroxypyr — 15.3%
Pyresta Herb.	Nichino America	G	2,4-D ester — 60% + Pyraflufen-ethyl — 0.2%
Q4 Plus Turf Herb. for Grassy & Broadleaf Weeds	PBIGordon Corp.	G	2,4-D amine — 11.81% + Dicamba — 1.49% + Sulfentrazone — 0.69% + Quinclorac — 8.43%
Quali-Pro 2-D	Makhteshim-Agan	G	Clopyralid — 12.1% + Triclopyr — 33%
Quali-Pro 3-D	Makhteshim-Agan	G	Propionic acid — 8.17% + Dicamba — 2.77% + 2,4-D amine — 30.56%
Quali-Pro T/l 2.5 G Herb.	Makhteshim-Agan	G	Isoxaben — 0.5% + Trifluralin — 2%
QuikPRO Herb.	Monsanto Co.	G	Diquat dibromide — 2.9% + Glyphosate, ammonium salt — 73.3%
Quincept Herb.	Nufarm Americas	G	Dicamba — 1.38% + 2,4-D — 13.24% + Quinclorac — 8.25%
Rage D-Tech Herb.	FMC Corp.	G	Carfentrazone-ethyl — 1.44% + 2,4-D ester — 65.52%
Rainbow Weed Killer	Rainbow Tech. Corp.	G	Diuron — 6% + Tebuthiuron — 2%
RangeStar	Albaugh	G	Dicamba — 12.4%

Product	Company	Use Class	Chemical Content
			+ 2,4-D amine — 35.7%
Rapport BroadSpec Herb.	Nufarm	G	Thifensulfuron methyl — 25% + Tribenuron-methyl — 25%
Rapport TankMix Herb.	Nufarm	G	Tribenuron-methyl — 10% + Thifensulfuron methyl — 40%
Razor Burn	Nufarm Americas	G	Diquat dibromide — 2.1% + Glyphosate — 41%
Ready-to-Use WorryFree Brand Home Pest Control	Lilly Miller Brands	G	Pyrethrins — 0.3% + Canola oil — 1%
RebelEX	Dow Agrosciences	G	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%
RebelEX CA	Dow Agrosciences	G	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%
Redeem R&P	Dow Agrosciences	G	Clopyralid — 12.1% + Triclopyr — 33%
Regal O-O Herb.	Regal Chem. Co.	G	Oxyfluorfen — 2% + Oxadiazon — 1%
RegalStar II	Regal Chem. Co.	G	Oxadiazon — 1% + Prodiamine — 0.2%
Renovate MAX G	Sepro Corp.	G	2,4-D amine — 14% + Triclopyr — 4%
Report Extra	Cheminova	G	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62%
RiceBeaux	RiceCo.	G	Thiobencarb — 31% + Propanil — 35%
RiceEdge 60 DF	RiceCo.	G	Propanil — 60% + Halosulfuron-methyl — 0.46%
RicePro	RiceCo.	G	Propanil — 43% + Quinclorac — 2%
RicePyr LC*	RiceCo.	G	Propanil — 36.5% + Triclopyr — 3.8%
Rifle-D Herb.	Loveland Prod.	G	Dicamba — 12.4% + 2,4-D amine — 35.7%
Roughneck	Nufarm	G	Glyphosate, ammonium salt — 3.42% + Glyphosate — 37.54%
Roundup Conc. Ext. Control Weed & Grass Killer + Weed Prev.	Monsanto Co.	G	Glyphosate — 18% + Diquat dibromide — 0.73% + Imazapic-ammonium — 0.3%
Roundup Conc. Poison Ivy & Tough Brush Killer Plus	Monsanto Co.	G	Triethylamine triclopyr — 2% + Glyphosate — 18%
Roundup Conc. Poison Ivy + Tough Brush Killer	Monsanto Co.	G	Triethylamine triclopyr — 2% + Glyphosate — 18%
Roundup QuikPRO Herb.	Monsanto Co.	G	Diquat dibromide — 2.9% + Glyphosate, ammonium salt — 73.3%
Roundup RTU Ext. Control Weed & Grass Killer + Weed Prev.	Monsanto Co.	G	Glyphosate — 1% + Imazapic-ammonium — 0.02%
Roundup RTU Ext. Control Weed & Grass Killer + Weed Prev. II	Monsanto Co.	G	Imazapic-ammonium — 0.02% + Pelargonic acid — 2% + Glyphosate — 1%
Roundup RTU Ext. Control Weed & Grass Killer1 + Weed Prev.	Monsanto Co.	G	Glyphosate — 1% + Dithiopyr — 0.03%
Roundup RTU Poison Ivy & Tough Brush Killer Plus	Monsanto Co.	G	Glyphosate — 1% + Triethylamine triclopyr — 0.1%
Roundup RTU Poison Ivy + Tough Brush Killer	Monsanto Co.	G	Glyphosate — 1% + Triethylamine triclopyr — 0.1%
Roundup RTU Weed & Grass Killer III	Monsanto Co.	G	Glyphosate — 2% + Pelargonic acid — 2%
Roundup Weed & Grass Killer Conc. Plus	Monsanto Co.	G	Glyphosate — 18% + Diquat dibromide — 0.73%
Roundup Weed & Grass Killer RTU Plus	Monsanto Co.	G	Glyphosate — 2% + Pelargonic acid — 2%

Product	Company	Use Class	Chemical Content
Roundup Weed & Grass Killer Sure Shot Foam	Monsanto Co.	G	Pelargonic acid — 1% + Glyphosate — 0.96%
Rout Ornamental Herb.	Everris NA/ Scotts Sierra Crop Prot.	G	Oxyfluorfen — 2% + Oryzalin — 1%
Sahara DG Herb.	BASF Corp.	G	Imazapyr — 7.78% + Diuron — 62.22%
Sequence	Syngenta Crop Prot.	G	S-Metolachlor — 29% + Glyphosate — 21.8%
SFM Extra	Alligare	G	Sulfometuron methyl — 56.25% + Metsulfuron-methyl — 15%
Showcase	Dow Agrosciences	G	Trifluralin — 2% + Oxyfluorfen — 0.25% + Isoxaben — 0.25%
Showdown	Helena Chem. Co	G	Glyphosate, ammonium salt — 3.42% + Glyphosate — 37.54%
Snap Pac Weed & Feed 25-0-4	Scotts Co.	G	2,4-D — 0.72% + Dichlorprop-P — 0.09% + Mecoprop-P — 0.15%
Snap Pac Weed & Feed 25-0-4 (5.1 Slow Release)	Scotts Co.	G	2,4-D — 0.72% + Dichlorprop-P — 0.09% + Mecoprop-P — 0.15%
Snapshot 2.5 TG	Dow Agrosciences	G	Trifluralin — 2% + Isoxaben — 0.5%
Solitare Herb.	FMC Corp.	G	Sulfentrazone — 18.75% + Quinclorac — 56.25%
Sonic	Dow Agrosciences	G	Sulfentrazone — 62.1% + Cloransulam-methyl — 7.9%
Spartan Advance Herb.	FMC Corp.	G	Glyphosate — 41.48% + Sulfentrazone — 5.7%
Spartan Charge Herb.	FMC Corp.	G	Sulfentrazone — 31.77% + Carfentrazone-ethyl — 3.53%
Spectracide Kudzu Poison Ivy/Oak and Other Tough Brush Killer	Spectrum Group	G	Dicamba — 0.07% + 2,4-D amine — 0.59% + Mecoprop — 0.14%
Spectracide Kudzu Poison Ivy/Oak and Other Tough Brush Killer Conc.	Spectrum Group	G	2,4-D ester — 9.74% + Dichlorprop-P — 4.78% + Dicamba — 1.65%
Spectracide Poison Ivy & Poison Oak Brush Killer	Spectrum Group	G	Dicamba — 0.07% + 2,4-D amine — 0.59% + Mecoprop — 0.14%
Spectracide Veg. Killer Conc. 2	Spectrum Group	G	Prometon — 2.2% + Diquat dibromide — 0.72%
Spectracide Veg. Killer RTU	Spectrum Group	G	Diquat dibromide — 0.05% + Prometon — 0.14%
Spectracide Weed & Grass Foaming Edger	Spectrum Group	G	Diquat dibromide — 0.18% + Fluazifop — 0.06% + Dicamba — 0.04%
Spectracide Weed & Grass Killer	Spectrum Group	G	Diquat dibromide — 0.18% + Fluazifop-P-butyl — 0.06% + Dicamba — 0.04%
Spectracide Weed & Grass Killer 2	Spectrum Group	G	Dicamba — 0.04% + Diquat dibromide — 0.12% + Fluazifop-P-butyl — 0.06%
Spectracide Weed & Grass Killer AccuShot Foaming Spray	Spectrum Group	G	Diquat dibromide — 0.18% + Fluazifop-P-butyl — 0.06% + Dicamba — 0.04%
Spectracide Weed & Grass Killer Conc. 2	Spectrum Group	G	Dicamba — 0.77% + Fluazifop-P-butyl — 1.15% + Diquat dibromide — 2.3%
Spectracide Weed & Grass Killer for Large Areas Conc.	Spectrum Group	G	Dicamba — 0.77% + Fluazifop-P-butyl — 1.15% + Diquat dibromide — 2.3%
Spectracide Weed & Grass Killer	Spectrum Group	G	Diquat dibromide — 0.12%

Product	Company	Use Class	Chemical Content
w/ Ext. Control			+ Oxyfluorfen — 0.1% + Fluazifop-P-butyl — 0.06% + Dicamba — 0.04%
Spectracide Weed & Grass Killer w/ Ext. Control Conc.	Spectrum Group	G	Dicamba — 0.77% + Fluazifop-P-butyl — 1.15% + Oxyfluorfen — 1.92% + Diquat dibromide — 2.3%
Spectracide Weed Stop for Lawns	Spectrum Group	G	Dicamba — 0.07% + 2,4-D amine — 0.59% + Mecoprop — 0.14%
Spectracide Weed Stop for Lawns AccuShot Foaming Spray	Spectrum Group	G	MCPP-P — 0.16% + Dichlorprop-p — 0.16% + 2,4-D amine — 0.33%
Spectracide Weed Stop for Lawns AccuShot Foaming Spray 2	Spectrum Group	G	Dicamba — 0.07% + Mecoprop — 0.14% + 2,4-D amine — 0.59%
Spectracide Weed Stop for Lawns Conc.	Spectrum Group	G	Mecoprop — 1.83% + 2,4-D amine — 7.59% + Dicamba — 0.84%
Spectracide Weed Stop for Lawns Crabgrass Prev. & Broadleaf Weed Killer Gran.	Spectrum Group	G	2,4-D — 0.64% + Dicamba — 0.06% + Dithiopyr — 0.16% + Mecoprop-P — 0.14%
Spectracide Weed Stop for Lawns + Crabgrass Killer	Spectrum Group	G	Sulfentrazone — 0.02% + Quinclorac — 0.12% + Dicamba — 0.03% + 2,4-D amine — 0.25%
Spectracide Weed Stop for Lawns + Crabgrass Killer Conc.	Spectrum Group	G	Dicamba — 0.43% + 2,4-D amine — 3.74% + Quinclorac — 1.79% + Sulfentrazone — 0.22%
Spectracide Weed Stop for Lawns + Crabgrass Prev. Gran.	Spectrum Group	G	2,4-D — 0.64% + Dicamba — 0.06% + Dithiopyr — 0.16% + Mecoprop-P — 0.14%
Speed Zone Broadleaf Herb. for Turf	PBIGordon Corp.	G	Dicamba — 1.71% + 2,4-D ester — 28.57% + Carfentrazone-ethyl — 0.62% + MCPP-p — 5.88%
Speed Zone South. Broadleaf Herb. for Turf	PBIGordon Corp.	G	Dicamba — 0.67% + 2,4-D ester — 10.49% + Carfentrazone-ethyl — 0.54% + MCPP-p — 2.66%
Spirit	Syngenta Crop Prot.	G	Prosulfuron — 14.2% + Primisulfuron-methyl — 42.8%
Spoiler Herb.	Nufarm Americas	G	2,4-D — 33.3% + Dichlorprop-P — 8.45% + Mecoprop-P — 8.58%
Sprakil SK-13 Granular Weed Killer	SSI Maxim Co.	G	Diuron — 3% + Tebuthiuron — 1%
Sprakil SK-26 Granular Weed Killer	SSI Maxim Co.	G	Tebuthiuron — 2% + Diuron — 6%
Spurge Power	Lawn and Garden Prod.	G	MCPA (and salts and esters) — 56.14% + Dicamba — 3.6% + Triclopyr — 0.5%
Spyder Extra Sel. Herb.	Nufarm Americas	G	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%
SquareOne Herb.	FMC Corp.	G	Quinclorac — 66.1% + Carfentrazone-ethyl — 3.9%
Stanza Extra	Fuzion Technologies	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Status Herb.	BASF Corp.	G	Diflufenzopyr — 17.1% + Dicamba — 44%

Product	Company	Use Class	Chemical Content
Step 2 Weed Control + Lawn Fert. 28-0-6	Scotts Co.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
Storm Herb.	United Phosphorus	G	Acifluorfen — 29.2% + Bentazon — 13.4%
Strada Pro	Isagro S.p.a.	G	Orthosulfamuron — 42.05% + Halosulfuron-methyl — 11.92%
Strada XT2	Isagro S.p.a.	G	Orthosulfamuron — 10% + Quinclorac — 60%
Strategy	Loveland Prod.	G	Clomazone — 5.6% + Ethalfluralin — 18.2%
Strike 3 Ultra 2	Winfield Solutions	G	Dichlorprop-p — 9.72% + 2,4-D amine — 39.3% + Fluroxypyr — 5.88%
Strike Three	Winfield Solutions	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + Mecoprop — 8.17%
Sulfomet Extra Herb.	Agsurf Corp.	G	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%
Super Trimec Broadleaf Herb.	PBIGordon Corp.	G	Dicamba — 5.38% + Dichloprop-p — 15.9% + 2,4-D ester — 32.45%
Super Turf Builder Weed & Feed	Scotts Co.	G	MCPP-p — 0.59% + 2,4-D — 1.18%
Super Turf Builder Winterguard Fall Weed & Feed 1	Scotts Co.	G	Mecoprop-P — 0.52% + 2,4-D — 1.03%
Super Turf Builder w/ Plus 2 Weed Control 27-3-12, 27-2-12	Scotts Co.	G	Mecoprop-P — 0.52% + 2,4-D — 1.03%
Super Turf Builder w/ Plus 2 Weed Control 29-3-3, 29-2-3	Scotts Co.	G	2,4-D — 1% + Mecoprop-P — 0.5%
Suprend	Syngenta Crop Prot.	G	Prometryn — 79.3% + Trifloxysulfuron-sodium — 0.7%
SureStart	Dow Agrosciences	G	Acetochlor — 41.67% + Clopyralid — 4.27% + Flumetsulam — 1.3%
Surflan XL 2G	United Phosphorus	G	Oryzalin — 1% + Benefin — 1%
Surge Broadleaf Herb. for Turf	PBIGordon Corp.	G	Dicamba — 3.02% + 2,4-D amine — 18.79% + MCPP-p — 6.8% + Sulfentrazone — 0.67%
T Zone Broadleaf Herb. for Tough Weeds	PBIGordon Corp.	G	Dicamba — 2.43% + 2,4-D ester — 31.82% + Triclopyr — 8.4% + Sulfentrazone — 0.73%
Tailspin Herb.	Loveland Prod.	G	Triclopyr — 16.1% + Fluroxypyr — 5.6%
Team 2G	Dow Agrosciences	G	Trifluralin — 0.67% + Benefin — 1.33%
Top Down	Check-Mark	G	2,4-D amine — 0.29% + Bromacil — 0.5%
Topsite 2.5G Herb.	SSI Maxim Co.	G	Diuron — 2% + Imazapyr — 0.5%
Tordon RTU	Dow Agrosciences	G	2,4-D amine — 20.9% + Picloram — 5.4%
Total Kill Lawn Weed Killer Conc.	Ortho Group	G	Mecoprop-P — 1.8% + 2,4-D amine — 3.6% + Dichlorprop-P — 1.8%
Total Kill Lawn Weed Killer RTS	Ortho Group	G	Mecoprop-P — 1.8% + 2,4-D amine — 3.6% + Dichlorprop-P — 1.8%
Total Kill Lawn Weed	Ortho Group	G	Dichlorprop-P — 0.16%

Product	Company	Use Class	Chemical Content
Killer RTU			+ 2,4-D — 0.33% + Mecoprop-P — 0.16%
Tractor Sup. Co. GroundWork Conc. Crabgrass & Broadleaf Weed Killer	PBIGordon Corp.	G	Dicamba — 0.6% + 2,4-D amine — 6.42% + Quinclorac — 2.13%
Tractor Sup. Co. GroundWork Conc. Lawn Weed Killer	PBIGordon Corp.	G	2,4-D amine — 7.59% + Dicamba — 0.84% + MCPP-p — 1.83%
Tractor Sup. Co. GroundWork Conc. Year-Long Veg. Killer	PBIGordon Corp.	G	Glyphosate — 3.82% + Imazapyr — 1.74%
Tractor Sup. Co. GroundWork Hose End Lawn Weed Killer	PBIGordon Corp.	G	MCPP-p — 1.34% + Dicamba — 0.62% + 2,4-D amine — 5.56%
Treaty Extra Herb.	Nufarm	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Triamine	Nufarm Americas	G	2,4-DP-p — 8.1% + MCPP-p — 8.2% + 2-4,D — 16.3%
Triamine Jet Spray Spot Weed Killer	Nufarm Americas	G	2,4-DP-p — 0.16% + 2,4-D — 0.33% + MCPP-p — 0.16%
Tribute Total	Bayer Env. Science	G	Thiencarbazone-methyl — 9.9% + Foramsulfuron — 19.8% + Halosulfuron-methyl — 30.8%
Trillium	Regal Chem. Co.	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + MCPP — 8.17%
Trimec 1000 Low Odor Broadleaf Herb.	PBIGordon Corp.	G	Dicamba — 2.68% + 2,4-D amine — 1.22% + 2,4-D amine — 34.59% + MCPP-p — 8.17%
Trimec 878 S.I. Herb.	PBIGordon Corp.	G	MCPP-p — 18.91% + 2,4-D amine — 10.86% + Dicamba — 4.62%
Trimec 899 Broadleaf Herb.	PBIGordon Corp.	G	MCPP-p — 8.17% + 2,4-D amine — 30.56% + Dicamba — 2.77%
Trimec 992 Broadleaf Herb.	PBIGordon Corp.	G	Dicamba — 2.77% + 2,4-D amine — 30.56% + MCPP-p — 8.17%
Trimec Bentgrass Formula Broadleaf Herb.	PBIGordon Corp.	G	2,4-D amine — 6.12% + Dicamba — 2.53% + MCPP-p — 9.92%
Trimec Classic Brand Broadleaf Herb.	PBIGordon Corp.	G	2,4-D amine — 25.93% + MCPP-p — 6.93% + Dicamba — 2.76%
Trimec Encore Broadleaf Herb.	PBIGordon Corp.	G	MCPA — 38.68% + Dicamba — 3.81% + MCPP-p — 8.16%
Trimec Lawn Weed Killer	South. Ag. Insecticides	G	Mecoprop — 5.3% + 2,4-D amine — 3.05% + Dicamba — 1.29%
Trimec Plus	PBIGordon Corp.	G	2,4-D amine — 5.83% + Dicamba — 1.46% + MSMA — 18% + MCPP-p — 2.93%
Trimec South. Broadleaf Herb. for Sensitive South. Grasses	PBIGordon Corp.	G	MCPP-p — 17.37% + 2,4-D amine — 18.74% + Dicamba — 3.85%
Triple Threat	Total Solutions	G	MCPP — 2.29% + 2,4-DP — 2.26% + 2,4-D — 4.55%
Triplet Low Odor Premium	Nufarm Americas	G	2,4-D — 47.33%

Product	Company	Use Class	Chemical Content
Sel. Herb.			+ Dicamba — 2.3% + Mecoprop-P — 8.17%
Triplet SF Sel. Herb.	Nufarm Americas	G	2,4-D — 30.56% + Dicamba — 2.77% + Mecoprop-P — 8.17%
Tri-Power Sel. Herb.	Nufarm Americas	G	Dicamba — 3.97% + MCPA — 40.42% + Mecoprop-P — 7.99%
TruPower2 Sel. Herb.	Nufarm Americas	G	2,4-D — 31.3% + Dicamba — 3.24% + Mecoprop-P — 7.86%
TruPower3 Sel. Herb.	Nufarm Americas	G	Mecoprop-P — 7.74% + 2,4-D amine — 47.77% + Dicamba — 3.2%
T-Square Herb.	Agsurf Corp.	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Turf Builder I w/ Plus 2 Weed Control 28-0-3	Scotts Co.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
Turf Builder Plus 2 Weed Control 28-2-4	Scotts Co.	G	Dichlorprop-P — 0.09% + 2,4-D amine — 0.72% + Mecoprop-P — 0.15%
Turf Builder Weed & Feed 1	Scotts Co.	G	2,4-D — 1.21% + MCPP-p — 0.61%
Turf Builder Winterguard I w/ Plus 2 Weed Control 28-0-3	Scotts Co.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
Turf Builder Winterguard w/ Plus 2 Weed Control 22-4-11	Scotts Co.	G	Mecoprop-P — 0.52% + 2-4,D — 1.04%
Turf Builder Winterguard w/ Plus 2 Weed Control 26-3-12, 26-2-12	Scotts Co.	G	2,4-D — 1.21% + Mecoprop-P — 0.61%
Turf Builder w/ Plus 2 Weed Control 28-3-3, 28-2-3, 28-1-4	Scotts Co.	G	2-4,D — 1.21% + Mecoprop-P — 0.61%
Turflon D	Dow Agrosciences	G	2,4-D ester — 34.4% + Triclopyr — 16.5%
Ureabor	Pro Serve	G	Sodium chlorate — 30% + Borate — 49% + Bromacil — 1.5%
Valor XLT Soybean Herb.	Valent U.S.A. Corp.	G	Chlorimuron-ethyl — 10.3% + Flumioxazin — 30%
Verdict Powered by Kixor Herb.	BASF Corp.	G	Dimethenamide-P — 55.04% + Saflufenacil — 6.24%
Vessel	Prokoz	G	Dicamba — 2.77% + MCPP-P — 8.17% + 2,4-D amine — 30.56%
Veteran 720 Herb.	Nufarm Americas	G	Dicamba — 12.82% + 2,4-D amine — 24.58%
Vigoro Ultra Turf Weed & Feed for Bahia & Mixed Lawns 28-0-3	Swiss Farms Prod.	G	Dicamba — 0.07% + 2,4-D — 1.11% + Mecoprop-P — 0.17%
Vigoro Weed & Feed for Bahia & Mixed Lawns 28-0-3	Swiss Farms Prod.	G	Dicamba — 0.07% + 2,4-D — 1.11% + Mecoprop-P — 0.17%
Volta Extra	Rotam N. America	G	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%
Volta Extra Herb.	Rotam N. America	G	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%
Weed & Feed Weed Control + Lawn Fert. 26-0-3	Scotts Co.	G	Mecoprop-P — 0.59% + 2,4-D — 1.18%
Weed And Brush Killer United 85	United Laboratories	G	Bromacil — 0.98% + 2,4-D ester — 1.09%
Weed Blast Residual Weed Control	Loveland Prod.	G	Bromacil — 4% + Diuron — 4%

Product	Company	Use Class	Chemical Content
Weed Control + Fert. (Step 2) 29-3-3, 29-2-3	Scotts Co.	G	Dicamba — 0.05% + 2,4-D — 1.25% + Mecoprop-P — 0.62%
Weed Impede 2 in 1 Concentrate	Lawn and Garden Prod.	G	Prodiamine — 7.51% + Glyphosate — 40.15%
Weed Impede 2 in 1 RTU	Lawn and Garden Prod.	G	Glyphosate — 2% + Prodiamine — 0.5%
Weed Whacker	Lawn and Garden Prod.	G	2,4-D amine — 4.55% + Dichlorprop-p — 2.26% + MCPA (and salts and esters) — 2.3%
Weed Whacker Jet Spray	Lawn and Garden Prod.	G	Dichlorprop-P — 0.16% + 2,4-D amine — 0.33% + Mecoprop-P — 0.16%
Weed-a-Cide	Check-Mark	G	Dicamba — 0.62% + 2,4-D amine — 5.56% + Mecoprop — 1.34%
Weedblast 4G Weed Killer	SSI Maxim Co.	G	Diuron — 2% + Bromacil — 2%
Weedmaster Herb.	Nufarm	G	2,4-D amine — 35.7% + Dicamba — 12.4%
Wipe-Out Crabgrass Killer Plus	Green Light	G	2,4-D amine — 7.3% + Dicamba — 0.84% + Quinclorac — 3.5%
Wither LVP Non-Sel. Weed Killer	Lawson Prod.	G	Bromacil — 0.61% + 2,4-D ester — 1.09%
XL 2G	Setre Chem. Co.	G	Benefin — 1% + Oryzalin — 1%
Yukon Herb.	Gowan Co.	G	Halosulfuron-methyl — 12.5% + Dicamba — 55%
Zemax Selective Herb.	Syngenta Crop Prot.	G	S-Metolachlor — 36.8% + Mesotrione — 3.68%

Herbicide Mixtures for Cropland — Restricted Use

Agrisolutions Confidence Xtra 5.6L Herb.	Monsanto Co.	R	Acetochlor — 33.4% + Atrazine — 26.9%
Agrisolutions Confidence Xtra Herb.	Monsanto Co.	R	Atrazine — 18.3% + Acetochlor — 46.3%
Alligare Picloram + D	Alligare	R	2,4-D amine — 39.6% + Picloram — 10.2%
Bicep II Magnum	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Bicep II Magnum FC	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Bicep Lite II Magnum	Syngenta Crop Prot.	R	Atrazine — 27.3% + S-Metolachlor — 35.8%
Brawl ll Atz Herb.	Tenkoz	R	S-Metolachlor — 26.1% + Atrazine — 33%
Bullet Herb.	Monsanto Co.	R	Alachlor — 25.4% + Atrazine — 14.5%
Cadence ATZ Herb.	Loveland Prod.	R	Acetochlor — 32.6% + Atrazine — 24.4%
Cadence Lite ATZ Herb.	Loveland Prod.	R	Atrazine — 16.3% + Acetochlor — 43.4%
Callisto XTRA	Syngenta Crop Prot.	R	Atrazine — 34.3% + Mesotrione — 5.36%
Corvus Herb.	Bayer Cropscience	R	Thiencarbazone-methyl — 7.6% + Isoxaflutole — 19%
Degree Xtra Herb.	Monsanto Co.	R	Atrazine — 14.5% + Acetochlor — 29%
Drexel Simazat 4L	Drexel Chem. Co.	R	Simazine — 21.41% + Atrazine — 21.03%
Drexel Trizmet II	Drexel Chem. Co.	R	Atrazine — 33.1%

Product	Company	Use Class	Chemical Content
			+ Metolachlor — 26.1%
DuPont Basis Gold Herb.	DuPont	R	Atrazine — 86.78% + Rimsulfuron — 1.34% + Nicosulfuron — 1.34%
DuPont Breakfree ATZ Herb.	DuPont	R	Atrazine — 24.4% + Acetochlor — 32.6%
DuPont Breakfree ATZ Lite Herb.	DuPont	R	Acetochlor — 43.4% + Atrazine — 16.3%
DuPont Cinch ATZ Herb.	DuPont	R	S-Metolachlor — 26.1% + Atrazine — 33% + S-Metolachlor — 26% + Atrazine — 33%
DuPont Cinch ATZ Lite Herb.	DuPont	R	Atrazine — 28.1% + S-Metolachlor — 35.8%
DuPont Steadfast ATZ Herb.	DuPont	R	Atrazine — 85.3% + Nicosulfuron — 2.7% + Rimsulfuron — 1.3%
Expert Herb.	Syngenta Crop Prot.	R	Atrazine — 22.9% + S-Metolachlor — 18.6% + Glyphosate — 10.8%
FulTime	Dow Agrosciences	R	Atrazine — 16.6% + Acetochlor — 24.8%
G-Max Lite Herb.	BASF Corp.	R	Dimethenamide-P — 24.1% + Atrazine — 29.5%
Grazon P+D	Dow Agrosciences	R	Picloram — 10.2% + 2,4-D — 39.6%
Guardsman Max Herb.	BASF Corp.	R	Atrazine — 35.3% + Dimethenamide-P — 18.2%
Harness Xtra 5.6L Herb.	Monsanto Co.	R	Acetochlor — 33.4% + Atrazine — 26.9%
Harness Xtra Herb.	Monsanto Co.	R	Atrazine — 18.3% + Acetochlor — 46.3%
HireHand P+D	Dow Agrosciences	R	Picloram — 10.2% + 2,4-D — 39.6%
Keystone	Dow Agrosciences	R	Acetochlor — 32.6% + Atrazine — 24.4%
Keystone LA	Dow Agrosciences	R	Acetochlor — 43.4% + Atrazine — 16.3%
Lariat Flowable Herb.	Monsanto Co.	R	Alachlor — 27.2% + Atrazine — 15.5%
Lexar EZ Herb.	Syngenta Crop Prot.	R	Mesotrione — 2.44% + S-Metolachlor — 19% + Atrazine — 18.61%
Lexar Herb.	Syngenta Crop Prot.	R	S-Metolachlor — 19% + Atrazine — 18.61% + Mesotrione — 2.44%
Lumax EZ Herb.	Syngenta Crop Prot.	R	Atrazine — 10.2% + S-Metolachlor — 27.1% + Mesotrione — 2.71%
Lumax Sel. Herb.	Syngenta Crop Prot.	R	S-Metolachlor — 29.4% + Atrazine — 11% + Mesotrione — 2.94%
Medal II AT Herb.	Syngenta Crop Prot.	R	Atrazine — 33% + S-Metolachlor — 26.1%
Medal II ATZ	Syngenta Crop Prot.	R	S-Metolachlor — 26.1% + Atrazine — 33%
Parallel Plus	Makhteshim-Agan	R	Atrazine — 30% + Metolachlor — 28.9%
PD 2	Albaugh	R	2,4-D amine — 39.6% + Picloram — 10.2% + Dicamba — 5.7%
Slider ATZ	Loveland Prod.	R	Dimethenamide-P — 18.2% + Atrazine — 35.3%

Product	Company	Use Class	Chemical Content
Slider ATZ Lite	Loveland Prod.	R	Atrazine — 29.5% + Dimethenamide-P — 24.1%
Sortie ATZ	Helena Chem. Co	R	Atrazine — 35.3% + Dimethenamid — 18.2%
Sortie ATZ Lite	Helena Chem. Co	R	Atrazine — 29.5% + Dimethenamide-P — 24.1%
Stalwart XTRA Herb.	Sipcam Agro Usa	R	Metolachlor — 26.1% + Atrazine — 33%
Surmount	Dow Agrosciences	R	Picloram — 13.24% + Fluroxypyr — 10.64%
SYN-A17227A Herb.	Syngenta Crop Prot.	R	Mesotrione — 2.94% + Metolachlor — 29.4% + Atrazine — 11%
Tordon 101 Mixture	Dow Agrosciences	R	Picloram — 10.2% + 2,4-D amine — 39.6%
TripleFLEX Herb.	Monsanto Co.	R	Acetochlor — 41.67% + Clopyralid — 4.27% + Flumetsulam — 1.3%
Trooper Extra Sel. Herb.	Nufarm Americas	R	2,4-D amine — 39.6% + Dicamba — 5.7% + Picloram — 10.2%
Trooper P+D Herb.	Nufarm Americas	R	2,4-D amine — 39.6% + Picloram — 10.2%
Trooper Pro Herb.	Nufarm Americas	R	Picloram — 19.42% + Fluroxypyr — 15.61%
Plant Growth Regulator Mixtures			
Aquashade	Aquashade	G	Acid Blue 9 — 12.6% + Acid Yellow 23 — 1.04%
Ascend	Winfield Solutions	G	Cytokinin (as kinetin) — 0.09% + Indolebutyric acid — 0.05% + Gibberellic acid — 0.03%
Chaperone	Arysta Lifescience	G	Sodium 5-nitroguaiacolate — 0.1% + Sodium o-nitrophenolate — 0.2% + Sodium p-nitrophenolate — 0.3%
Consensus	Loveland Prod.	G	Chitosan — 1% + Salicylic acid — 0.04% + IBA — 0.02%
Cytoplex HMS	P.B.T.	G	Cytokinin (as kinetin) — 0.01% + Indole-3-butyric acid — 0.01% + Gibberellic acid — 0%
Dip'N Grow	Dip'n Grow	G	Indole-3-butyric acid — 1% + Naphthylacetic acid — 0.5%
DuPont Gin Out Plant Growth Reg.	DuPont	G	Mepiquat chloride — 4.2% + Kinetin (plant hormone) — 0%
DuPont Mepex Gin Out Plant Growth Reg.	DuPont	G	Kinetin (plant hormone) — 0% + Mepiquat chloride — 4.2%
Edgeless Liq.	Sepro Corp.	G	Flurprimidol — 13.26% + Trinexapac-ethyl — 5%
Fascination Plant Growth Reg. Solution	Valent Biosciences Corp.	G	Gibberellin — 1.8% + Cytokinin B — 1.8%
Finish 6 Pro Harvest Aid for Cotton	Bayer Cropscience	G	Cyclanilide — 3.3% + Ethephon — 52.6%
Helena PGR-IV Plus	Helena Chem. Co	G	Gibberellic acid — 0.23% + Bacillus cereus strain BP01 — 0.1%
Legacy	Sepro Corp.	G	Flurprimidol — 13.26% + Trinexapac-ethyl — 5%
MegaGro	CP Bio	G	IBA — 0.85% + Kinetin (plant hormone) — 0.15%
Mepex Gin Out Plant Growth Reg.	Nufarm Americas	G	Kinetin (plant hormone) — 0% + Mepiquat chloride — 4.2%
Musketeer	Sepro Corp.	G	Trinexapac-ethyl — 1.4%

Product	Company	Use Class	Chemical Content
			+ Paclobutrazol — 5.6% + Flurprimidol — 5.6%
PGR IV	Arysta Lifescience	G	Indolebutyric acid — 0% + Gibberellic acid — 0%
Pix Plus	Arysta Lifescience	G	Mepiquat chloride — 4.2% + Bacillus cereus strain BP01 — 0.01%
Potenza	Loveland Prod.	G	Indolebutyric acid — 0.06% + Mepiquat chloride — 4.2% + Kinetin (plant hormone) — 0%
Radiate	Loveland Prod.	G	IBA — 0.85% + Cytokinin (as kinetin) — 0.15%
Rootone Brand F Rooting Hormone	Bayer Cropscience	G	Thiram — 4.04% + 1-Naphthaleneacetamide — 0.2%
Stance Plant Reg.	Bayer Cropscience	G	Cyclanilide — 2.1% + Mepiquat chloride — 8.4%
Stimulate Yield Enhancer	Stoller Ent.	G	Cytokinin (as kinetin) — 0.01% + Gibberellic acid — 0.01% + Indole-3-butyric acid — 0.01%
Typy Plant Growth Reg. Solution	Nufarm Americas	G	Benzyladenine — 1.8% + Gibberellin A4 mixt. w/ Gibberellin A7
Defoliant Mixtures for Cropland			
Adios Cotton Defoliant	Arysta Lifescience	G	Thidiazuron — 12% + Diuron — 6%
CutOut Cotton Defoliant	Nufarm Americas	G	Thidiazuron — 12% + Diuron — 6%
Display Cotton Harvest Aid	FMC Corp.	G	Carfentrazone-ethyl — 18.04% + Fluthiacet-methyl — 4.75%
DuPont CottonQuik Cotton Harvest Aid/Defoliant	DuPont	G	Urea, sulfate (1:1) — 58.6% + Ethephon — 18.3%
DuPont FirstPick Cotton Harvest Aid/Defoliant	DuPont	G	Urea, sulfate (1:1) — 58.6% + Ethephon — 18.3%
FirstPick Cotton Harvest Aid/Defoliant	Nufarm Americas	G	Urea, sulfate (1:1) — 58.6% + Ethephon — 18.3%
Ginstar EC Cotton Defoliant	Bayer Cropscience	G	Thidiazuron — 12% + Diuron — 6%
Redi-Pik 1.5EC Cotton Defoliant	Makhteshim-Agan	G	Diuron — 6% + Thidiazuron — 12%
Redi-Pik 1.5EC Defoliant	Makhteshim-Agan	G	Thidiazuron — 12% + Diuron — 6%
Fumigant Mixtures for Cropland			
Brom-O-Gas 2%	Great Lakes Chem. Corp.	R	Methyl bromide — 98% + Chloropicrin — 2%
Hi-Yield Total Release Fogger	Voluntary Purch. Groups	G	Pyrodone — 0.4% + Pyrethrins — 0.05% + Permethrin — 0.44%
MBC Conc.	Hendrix and Dail	R	Methyl bromide — 98% + Chloropicrin — 2%
Pic Clor 60	TriEst Ag Group	R	1,3-Dichloropropene — 39% + Chloropicrin — 59.6%
Pic Clor 60 EC	TriEst Ag Group	R	1,3-Dichloropropene — 37.1% + Chloropicrin — 56.7%
Terr-O-Gas 67	Great Lakes Chem. Corp.	R	Methyl bromide — 67% + Chloropicrin — 33%
Terr-O-Gas 75	Great Lakes Chem. Corp.	R	Chloropicrin — 25% + Methyl bromide — 75%
Terr-O-Gas 98	Great Lakes Chem. Corp.	R	Chloropicrin — 2% + Methyl bromide — 98%
Tri-Brom 50	TriEst Ag Group	R	Methyl bromide — 50% + Chloropicrin — 49.7%

Product	Company	Use Class	Chemical Content
Tri-Brom 80	TriEst Ag Group	R	Chloropicrin — 19.9% + Methyl bromide w/chloropicrin — 80%
Tri-Brom 98	TriEst Ag Group	R	Chloropicrin — 2% + Methyl bromide — 98%
	Weed and Feed Combos		
Ace Green Turf RTS Weed & Feed Conc.	Chemsico	G	Mecoprop — 1.63% + 2,4-D amine — 3.25% + Dichlorprop-P — 1.61%
Ace Green Turf Weed & Feed 30-0-4	Lebanon Seaboard Corp.	G	2,4-D amine — 1.11% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Ace Green Turf Weed and Feed 29-0-3	Lebanon Seaboard Corp.	G	2,4-D amine — 1.11% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Ace Green Turf Wint. Weed and Feed 24-0-12	Lebanon Seaboard Corp.	G	2,4-D amine — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Andersons Golf Prod. 36-0-0 w/ Dimension Turf Herb. & Ronstar	Andersons Lawn Fert. Div.	G	Dithiopyr — 0.13% + Oxadiazon — 1%
Andersons Pro. Turf Prod. 20-3-3 w/ Trimec Brand Herb. & PCSCU	Andersons Lawn Fert. Div.	G	Dicamba — 0.06% + 2,4-D amine — 0.69% + MCPP-P-potassium — 0.15%
Andersons Pro. Turf Prod. Fert. 16-0-8 w/ Escalade Herb.	Andersons Lawn Fert. Div.	G	2,4-D ester — 0.87% + Fluroxypyr — 0.21% + Dicamba — 0.07%
Andersons Turf Prod. Fert. w/ LockUp & Dicamba Herb. 18-0-5	Andersons Lawn Fert. Div.	G	Dicamba — 0.07% + Penoxsulam — 0.03%
Bonide DuraTurf Weed & Feed	Bonide Prod.	G	2,4-D amine — 0.18% + 2,4-D ester — 1.35% + MCPA — 0.36% + Dicamba — 0.09%
Bonide Liq. Weed & Feed 20-0-0 RTS	Bonide Prod.	G	2,4-D amine — 2.26% + Propionic acid — 1.17%
Expert Gardener Liq. Weed & Feed 15-0-0	Gro Tec	G	Mecoprop — 1.63% + Propionic acid — 1.61% + 2,4-D amine — 3.25%
Expert Gardener Weed & Feed	Gro Tec	G	Mecoprop-P — 0.16% + Dicamba — 0.06% + Mecoprop — 0.81%
Fert. w/Starteem #2	Harrell's	G	Trifluralin — 0.25% + Benefin — 0.25% + Oxadiazon — 0.75%
Fert. w/Team Pro 0.86%	Harrell's	G	Trifluralin — 0.43% + Benefin — 0.43%
Ferti-lome A-Vert + Lawn Food	Voluntary Purch. Groups	G	Benefin — 0.53% + Isoxaben — 0.29% + Trifluralin — 0.27%
Ferti-lome Centipede Weed & Feed	Voluntary Purch. Groups	G	Dicamba — 0.07% + MCPP-P — 0.29% + 2,4-D amine — 0.17%
Ferti-lome Crabgrass Prev. + Lawn Fert.	Voluntary Purch. Groups	G	Trifluralin — 0.39% + Benefin — 0.76%
Ferti-lome Pro. Turf Weed Out Lawn Fert. + Crabgrass Prev.	Voluntary Purch. Groups	G	2,4-D — 0.64% + Dicamba — 0.06% + Mecoprop-P — 0.14% + Dithiopyr — 0.19%
Ferti-lome Weed Free Zone + Lawn Fert.	Voluntary Purch. Groups	G	Mecoprop-P — 0.17% + 2,4-D ester — 1.15%

Product	Company	Use Class	Chemical Content
			+ Dicamba — 0.07% + Sulfentrazone — 0.03%
Ferti-lome Weed Out + Lawn Fert.	Voluntary Purch. Groups	G	Dicamba — 0.07% + MCPP-P — 0.29% + 2,4-D amine — 0.17%
Fortify Phosphorus Free Wint. + Weed Control 18-0-12	Andersons Lawn Fert. Div.	G	MCPP-P — 0.15% + 2,4-D amine — 0.56% + Dichlorprop-p — 0.14%
Fortify Weed & Feed 22-0-3	Andersons Lawn Fert. Div.	G	MCPP-P — 0.15% + 2,4-D amine — 0.56% + Dichlorprop-p — 0.14%
Fortify Weed & Feed 28-3-3	Andersons Lawn Fert. Div.	G	Dichlorprop-p — 0.18% + 2,4-D amine — 0.7% + MCPP-P — 0.18%
Fortify Weed Control Gran.	Andersons Lawn Fert. Div.	G	Dichlorprop-p — 0.4% + Dicamba — 0.18% + 2,4-D amine — 1.65%
Gordon's Liq. Weed & Feed 2 15-0-0	PBIGordon Corp.	G	MCPP-p — 2.33% + 2,4-D amine — 4.51%
Gordon's Pasture Pro + One-Step Weed & Feed 15-0-0	PBIGordon Corp.	G	2,4-D amine — 1.26% + 2,4-D amine — 2.57%
Green Care Weed & Feed 12-0-6	Gro Tec	G	Mecoprop-P — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Green Charm Weed and Feed w/ Triamine 10-6-4	Gro Tec	G	2,4-D — 0.31% + 2,4-D — 0.15% + Dichlorprop-P — 0.16%
Green Thumb Early Spring Crabgrass Prev. + Lawn Fert. (27-0-5)	Andersons Lawn Fert. Div.	G	Trifluralin — 0.38% + Benefin — 0.77%
Green Thumb Late Spring Weed & Feed Lawn Fert. (29-0-3)	Andersons Lawn Fert. Div.	G	2,4-D amine — 0.7% + MCPP-P — 0.18% + Dichlorprop-p — 0.18%
Green Thumb Premium Crabgrass Prev. + Lawn Fert. (36-3-4)	Andersons Lawn Fert. Div.	G	Trifluralin — 0.38% + Benefin — 0.77%
Green-Sol GS48	Frit Industries	G	Kinetin (plant hormone) — 0.01% + Gibberellic acid — 0.02%
Greenview Broadleaf Weed Control + Lawn Food	Lebanon Seaboard Corp.	G	2,4-D amine — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Gro-Fine Economy Weed & Feed 11-0-7	Knox Fert. Co.	G	2,4-D ester — 1.11% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Groundwork Weed & Feed 23-0-7	Winfield Solutions	G	MCPP — 0.12% + Dicamba — 0.05% + 2,4-D — 0.55%
Hi-Yield Weed & Feed	Voluntary Purch. Groups	G	Dicamba — 0.08% + MCPP-P — 0.32% + 2,4-D amine — 0.18%
HJE All Season Weed & Feed w/ Lazer	Howard Johnson's Ent.	G	2,4-D amine — 0.66% + Dicamba — 0.03% + Mecoprop-P — 0.16%
HJE All Season Weed & Feed w/ Triamine	Howard Johnson's Ent.	G	Mecoprop-P — 0.16% + 2,4-D amine — 0.31% + Dichlorprop-P — 0.16%
Howard Johnson's Premium Fert. Fall Weed and Feed Phosphate Free 18-0-9	Howard Johnson's Ent.	G	2,4-D ester — 1.15% + Dicamba — 0.07% + Mecoprop-P — 0.17% + Sulfentrazone — 0.03%
Howard Johnson's Premium Fert. Weed and Feed Phosphate	Howard Johnson's Ent.	G	2,4-D ester — 1.35% + 2,4-D amine — 0.18%

Product	Company	Use Class	Chemical Content
Free 26-0-3			+ Dicamba — 0.09% + Mecoprop-P — 0.36%
Howard Johnson's Viper Weed and Feed	Howard Johnson's Ent.	G	Dicamba — 0.07% + 2,4-D amine — 0.15% + 2,4-D ester — 1.08% + Mecoprop-P — 0.29%
KGRO Premium Weed & Feed 30-0-3	Knox Fert. Co.	G	2,4-D ester — 1.11% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Kgro Weed & Feed 20-0-0	Swiss Farms Prod.	G	MCPP — 1.15% + Propionic acid — 1.13% + 2,4-D — 2.29%
Lesco Echelon 0.3% + Fert.	Lesco	G	Prodiamine — 0.2% + Sulfentrazone — 0.1%
Lesco Echelon 0.3% + Fert. 11-0-5	Lesco	G	Prodiamine — 0.2% + Sulfentrazone — 0.1%
Lesco Echelon 0.5% + Fert.	Lesco	G	Sulfentrazone — 0.17% + Prodiamine — 0.33%
Lesco Echelon 0.5% + Fert. 19-0-9	Lesco	G	Sulfentrazone — 0.17% + Prodiamine — 0.33%
Lesco Momentum Force 21-0-11E Weed & Feed	Lesco	G	Mecoprop-P — 0.32% + 2,4-D ester — 1.2% + 2,4-D amine — 0.16% + Dicamba — 0.08%
Lesco Momentum force Weed & Feed	Lesco	G	Mecoprop-P — 0.32% + 2,4-D ester — 1.2% + 2,4-D amine — 0.16% + Dicamba — 0.08%
Lesco Weed & Feed + Fert.	Lesco	G	Dichlorprop-P — 0.14% + 2,4-D — 0.56% + Mecoprop-P — 0.15%
Lesco Weed & Feed 18-0-9M	Lesco	G	Dichlorprop-P — 0.14% + 2,4-D — 0.56% + Mecoprop-P — 0.15%
Lilly Miller Ultragreen Weed & Feed w/ Trimec Herb.	Lilly Miller Brands	G	Dicamba — 0.07% + 2,4-D amine — 0.65% + Dichlorprop-p — 0.16%
Pennington Seed Echelon 0.3% Granular Herb. on Fert.	Howard Johnson's Ent.	G	Sulfentrazone — 0.1% + Prodiamine — 0.2%
Pennington Signature Series Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Pennington Signature Series Wint. Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Preen Lawn StepSaver Weed Control + Fert 24-0-6	Lebanon Seaboard Corp.	G	2,4-D ester — 1.11% + Dithiopyr — 0.16% + Dicamba — 0.07% + Mecoprop-P — 0.17%
Preen Lawn StepSaver Weed Control + Fert.	Lebanon Seaboard Corp.	G	2,4-D amine — 0.76% + Diflufenzopyr — 0.07% + Mecoprop-P — 0.17% + Diflufenzopyr — 0.06% + Dithiopyr — 0.16% + Mecoprop-P — 0.14% + 2,4-D amine — 0.64%
Scotts Turf Builder Winterguard Fall Weed & FeedI	Scotts Co.	G	2,4-D — 1.21% + Mecoprop-P — 0.61%
Sta-Green Phos Free Wint. Weed & Feed	Infinity Fert.	G	Ethylhexyl phthalate — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Sta-Green Phosphorus Free	Gro Tec	G	Mecoprop — 0.17%

Product	Company	Use Class	Chemical Content
Weed & Feed			+ Dicamba — 0.07% + 2,4-D — 1.11%
Sta-Green Phosphorus Free Wint. Weed & Feed	Gro Tec	G	Mecoprop — 0.17% + Dicamba — 0.07% + 2,4-D — 1.11%
Sta-Green RTS Weed & Feed 20-0-0	Spectrum Group	G	Dichlorprop-P — 1.61% + 2,4-D amine — 3.25% + Mecoprop — 1.63%
Sta-Green Weed & Feed	Infinity Fert.	G	Ethylhexyl phthalate — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%
Step 2 Weed Control Plus Lawn Food	Scotts Co.	G	2,4-D — 1.18% + Mecoprop-P — 0.59%
Vigoro Super Green Lawn Fert. + X-tended Weed Control 32-0-4	Swiss Farms Prod.	G	Dicamba — 0.06% + Dithiopyr — 0.19% + 2,4-D — 0.64% + Mecoprop-P — 0.14%
Vigoro Ultra Turf Phosphorus Free Weed & Feed 28-0-3	Swiss Farms Prod.	G	Mecoprop-P — 0.17% + 2,4-D — 1.11% + Dicamba — 0.07%
Vigoro Ultra Turf RTS Weed & Feed 20-0-0	Spectrum Group	G	2,4-D amine — 3.25% + Mecoprop — 1.63% + Dichlorprop-P — 1.61%
Vigoro Weed & Feed 28-0-3	Swiss Farms Prod.	G	2,4-D — 1.11% + Mecoprop-P — 0.17% + Dicamba — 0.07%

ADJUVANTS FOR HERBICIDES

Surfactants

The surfactant concentrations recommended in the guidelines are based on the use of surfactants that are 85% (+10%) active. All numbers have been rounded off to the nearest whole number in the following list of adjuvants currently registered. If a surfactant is used with a lower level of activity, proportionally more should be used to obtain the desired concentration. The surfactant market provides a variety of trade names with great differences in levels of active ingredients.

Because of the confusion that frequently occurs concerning the purchase of a suitable surfactant, the following suggestions are provided:

1. Purchase a surfactant specifically manufactured and marketed for use in agriculture; use only nonionic surfactants sold specifically for use with herbicides and cleared for use under Public Law 518.

2. Purchase on the basis of percentage active ingredient. It is less profitable, for example, to purchase a product with 20% active ingredient at $4 per gallon than it is to purchase a product with 80% active ingredient at $10 per gallon.

3. Do not consider isopropyl alcohol or water as active ingredients. Many products on the market are deceptive because they may include isopropyl alcohol (isopropanol) as a "functioning agent" or some other nondescript term to imply that the alcohol is an active ingredient. If the label on the container does not specifically state the percentage active ingredient (% surfactant) in the container, ask the dealer for this information.

4. Do not purchase products manufactured for household use to use with herbicides. Many of the surfactants present in household detergents and related products are excellent surfactants per se, but they may be present in low concentrations, in mixtures, or in combination with other products that interact with herbicides to reduce the level of weed control obtained.

5. Be wary of claims that a surfactant may cost much more but can be used at concentrations much lower than with conventional surfactants. Evidence does not exist that there is any one particular surfactant being marketed that is so effective that the amount normally needed for adequate control can be greatly reduced as compared to other suitable surfactants that are available. Premium prices may be paid for surfactants marketed in this manner with a poor return on the investment.

6. In deciding on the most economical surfactant to purchase for use with herbicides, ignore the following claims: (1) the surfactant contains a silicone or some other agent that will help keep the spray equipment clean; (2) the surfactant increases water penetration into the soil; or (3) use of the surfactant will increase root penetration and nutrient uptake by the crop. Often these claims have not been verified. The use of such claims may imply that the product being offered will cost more than surfactants being offered by reputable agricultural outlets.

7. There are no "miracle" surfactants. There are many good surfactants on the market, but there are none that justify greatly increased prices. There are none that are so highly effective that the use rate can be reduced below that recommended for specific herbicides in these weed control guidelines.

8. Some companies recommend the use of certain adjuvants with their products. Consult labels for approved adjuvants.

Oil + Surfactants and/or Emulsifiers

Several poorly defined terms characterize this group of adjuvant mixtures. The suggested addition of a crop oil concentrate (COC) refers to products that contain 80 to 85% petroleum or vegetable oil plus 15 to 20% surfactant and emulsifiers. Use of blends, other than emulsifiable oils, containing more than 85% oil has not been evaluated adequately for use with herbicides.

The term "emulsifiable oil" generally refers to products that contain about 98% oil and 1 to 2% emulsifiers. The terms "nonphytotoxic oils" and "phytobland oils" also have been used for this group of adjuvants. Generally, crop oil concentrates are being used in place of emulsifiable oils in herbicide spray mixtures.

Registered Adjuvants

Manufacturer	Brand name	% Active agent
Access Business Group, Intl	APSA-80 All Purpose Spray Adjuvant Concentrate	20.00
Ag Source	Assist Polymer Based Adjuvant	99.97
AgXplore International	NZONE	33.00
Becker Underwood	Impact	90.00
Becker Underwood	Canteen	20.00
Brewer International	Cide-Kick II	100.00
Brewer International	Poly Control 2	30.00
Calumet Lubricants Co.	Orchex 796	100.00
Check-Mark	Transmit	81.75
Chemorse	Chemtrol Deposition Aid Drift Retardant	1.00
Chemorse	Conquer Spray Adjuvant	92.50
Chemtura Corp.	Foam Eater Squeeze	10.00
Davidon	DRP-955 Drift Retardant and Penetrator	5.20
Diacon Technologies	Diamulse C	100.00
Diacon Technologies	Diamulse CX	60.00
Diacon Technologies	Diamulse 11	18.00
Diacon Technologies	Diamulse D	87.00
Drexel Chemical Co.	Drexel Beanoil	40.00
Drexel Chemical Co.	Drexel Primary	60.00
Drexel Chemical Co.	Drexel AMS-Supreme	34.00
Drexel Chemical Co.	Drexel AMS-Xtra	34.00
Drexel Chemical Co.	Drexel Peptoil	83.00
Drexel Chemical Co.	Drexel Beanoil	60.00
Drexel Chemical Co.	Drexel Holzit	100.00
Drexel Chemical Co.	Drexel Hum-AC 820	80.00
Drexel Chemical Co.	Drexel Lox	100.00
Drexel Chemical Co.	Drexel Lox Plus	45.20
Drexel Chemical Co.	Drexel Pas-800	80.00
Drexel Chemical Co.	Drexel Primary	40.00
Drexel Chemical Co.	Drexel Sir-Factant	80.00
Drexel Chemical Co.	Drexel Special 80	80.00
Drexel Chemical Co.	Drexel Surf-AC 820	80.00
Drexel Chemical Co.	Drexel Surf-AC 910	90.00
Drexel Chemical Co.	Drexel Vegetoil	93.00
Drexel Chemical Co.	Drexel Vegetoil	7.00
Drexel Chemical Co.	Drexel Peptoil	17.00
Drexel Chemical Co.	Drexel AMS-Supreme	2.50
DuPont	DuPont SPA Care pH Stabilizer	98.00
DuPont	DuPont SPA Care pH Stabilizer	2.00
Ecolab	ES-1000	71.20
Ecolab	ES-2000	1.75
Ecolab	ES-1000	20.00
Ecolab	Boost 3001	4.90
Ecolab	Boost 3201	4.90
Ecolab	Exspor Activator Concentrate	10.80
Ecolab	Boost 3001	6.00
Ecolab	Boost 3201	6.00
Ecolab	Boost 3201	6.00
Ecolab	Boost 3001	6.00
Ecolab	Liquid K	15.40
Ecolab	Liquid K	2.98
Ecolab	Liquid K	1.40
Ecolab	ES-1000	8.00
Evonik Goldschmidt Corp.	Break-Thru	100.00
Evonik Goldschmidt Corp.	Break-Thru T&O	100.00
Exacto	Audible 90 MS	90.00
Exacto	Audible 80 MS	80.00
Exacto	Scrimmage MS	90.00
Exacto	Motion MS	100.00
Exacto	Handoff MS	95.00
Exacto	Yardage MS	80.00
Exacto	Completion MS	45.00
Fmc Corp.	HRS	25.50
Helena Chemical Co.	Ad-Spray 90	90.00
Helena Chemical Co.	Cidewinder	98.00

Manufacturer	Brand name	% Active agent
Helena Chemical Co.	Cohere	90.00
Helena Chemical Co.	Hyper-Active	24.00
Helena Chemical Co.	Hyper-Active	56.00
Helena Chemical Co.	Induce	90.00
Helena Chemical Co.	Inlet	90.00
Helena Chemical Co.	Kammo Plus	100.00
Helena Chemical Co.	NXS	80.00
Helena Chemical Co.	Pro-Mate Citrus Plus	100.00
Helena Chemical Co.	Request	50.00
Helena Chemical Co.	Sta-Put Plus	0.81
Helena Chemical Co.	Blendex VHC	90.00
Helena Chemical Co.	Ground Zero	100.00
Helena Chemical Co.	Optima	90.00
Helena Chemical Co.	Dyne-A-Pak	76.00
Helena Chemical Co.	Foambuster	20.00
Helena Chemical Co.	Kinetic	99.00
Helena Chemical Co.	Interactive	43.00
Helena Chemical Co.	Grounded	99.00
Helena Chemical Co.	Align	35.00
Helena Chemical Co.	Soy-Dex Plus	99.00
Helena Chemical Co.	Strikezone MXD	100.00
Helena Chemical Co.	Accuquest WM	35.00
Helena Chemical Co.	Quest	50.00
Helena Chemical Co.	Penetrator Plus	99.00
Helena Chemical Co.	Crop Oil Concentrate	85.00
Helena Chemical Co.	Ad Spray 101	23.60
Helena Chemical Co.	First Up ST	15.00
Helena Chemical Co.	Accuzone DC	100.00
Helena Chemical Co.	Premium MSO	100.00
Helena Chemical Co.	Agri-Dex	99.00
Helena Chemical Co.	Nutrasyst	5.00
Helena Chemical Co.	Nutrasyst Concentrate	3.00
Helena Chemical Co.	Foambuster Max	30.00
Helena Chemical Co.	Kinetic HV	99.00
Helena Chemical Co.	Hel-Fire	90.00
Helena Chemical Co.	Dyne-Amic	99.00
Helena Chemical Co.	Ad-Spray 80	80.00
Helena Chemical Co.	Pointblank WM	100.00
Helena Chemical Co.	Induce (CA)	90.00
Helena Chemical Co.	Duce	100.00
Helena Chemical Co.	Fire-Zone	100.00
Helena Chemical Co.	Clasp	0.81
Jimmy Sanders	Equalizer	80.00
Jimmy Sanders	Superfact	95.00
Jimmy Sanders	Supermax AMS Dry Formulation	100.00
Jimmy Sanders	Soysurf MSO	100.00
Jimmy Sanders	Silsurf	99.00
Jimmy Sanders	Inside Out	100.00
Jimmy Sanders	Contact	30.00
Jimmy Sanders	Complement	80.00
Jimmy Sanders	Soysurf X-tra	76.00
Jimmy Sanders	Surfoil Plus	97.00
Jimmy Sanders	Super Surf 90	90.00
Jimmy Sanders	Super Max AMS	36.00
Jimmy Sanders	Soysurf Plus	100.00
Jimmy Sanders	Low Foam Surfactant	80.00
Jimmy Sanders	High Foam Marker	100.00
Jimmy Sanders	Ag-Edge	100.00
Jimmy Sanders	Soysurf	100.00
Jimmy Sanders	Surfoil 60/40	100.00
Jimmy Sanders	Gundown Max	90.00
Jimmy Sanders	Surfoil	99.00
Jimmy Sanders	Chemtrol	1.00
Lawn and Garden Products	Herbicide Helper	80.00
Lawn and Garden Products	Monterey - Nature’s Own Spray Helper	3.00

Manufacturer	Brand name	% Active agent
Lawn and Garden Products	Monterey - Nature's Own Spray Helper	80.00
Lawn and Garden Products	Monterey - Nature's Own Spray Helper	17.00
Lawn and Garden Products	Herbicide Helper	20.00
Lesco	Lesco Conform	19.00
Lesco	Lesco Conform	20.00
Lesco	Lesco 90/10 Nonionic Surfactant	90.00
Loveland Products	Herbimax	83.00
Loveland Products	Herbimax	16.32
Loveland Products	Spreader 90	90.00
Loveland Products	Timberland 90 Low Foam Non-Ionic Spreader	90.00
Loveland Products	E-Z Mix	65.00
Loveland Products	Phase II	80.00
Loveland Products	Hi Wett Super Spreader	100.00
Loveland Products	Gunsmoke	80.00
Loveland Products	Timbersurf 90 Non-Ionic Spreader	90.00
Loveland Products	Actamaster Soluble Crystal Spray Adjuvant	99.00
Loveland Products	Actamaster Spray Adjuvant	34.00
Loveland Products	Attach	100.00
Loveland Products	Amigo	93.00
Loveland Products	MSO Concentrate	100.00
Loveland Products	Liberate	100.00
Loveland Products	Freeway	100.00
Loveland Products	Activator 90	90.00
Loveland Products	LI 700	80.00
Loveland Products	Phase	90.00
Loveland Products	Choice Weather Master	50.00
Loveland Products	Tactic	63.40
Loveland Products	Reign	1.00
Loveland Products	Flame	52.70
Loveland Products	Reign LC	30.00
Loveland Products	Compadre	100.00
Loveland Products	MSO Concentrate with Leci-Tech	100.00
Loveland Products	Weather Gard Complete	100.00
Loveland Products	Maximizer Crop Oil Concentrate	83.00
Loveland Products	Maximizer Crop Oil Concentrate	16.30
Loveland Products	Bond Max	57.50
Loveland Products	Widespread Max	100.00
Loveland Products	Unfoamer	12.50
Loveland Products	Vader	90.00
Loveland Products	Scanner	80.00
Loveland Products	Franchise	100.00
Loveland Products	Amaze Gold	34.00
Miller Chemical and Fertilizer Corp.	Exit	100.00
Miller Chemical and Fertilizer Corp.	Foam Fighter	100.00
Miller Chemical and Fertilizer Corp.	Mist Control	100.00
Miller Chemical and Fertilizer Corp.	Nu-Film-IR	100.00
Miller Chemical and Fertilizer Corp.	Nu Film P	100.00
Miller Chemical and Fertilizer Corp.	Nu Film 17	100.00
Miller Chemical and Fertilizer Corp.	Spray Aide	100.00
Monty's Plant Food Co.	Monty's NanoBoost	9.50
Nalco Co.	Nalco 03PO125	15.00
Nalco Co.	Nalco 60625	15.00
Ohp	Suffusion Granules	22.00
Ohp	Suffusion Liquid	100.00
Ohp	Suffusion Tablets	100.00
Oro Agri	WETCIT	8.92
PBIGordon Corp.	TransFilm Anti-Transpirant & Sticker	14.93
PBIGordon Corp.	TransFilm Anti-Transpirant & Sticker	13.54
PBIGordon Corp.	Gordon's Spreader Sticker	80.00
Precision Laboratories	Simplyx	100.00
Precision Laboratories	Transport LPH	100.00
Precision Laboratories	AMS Elite	54.00
Precision Laboratories	Border AQ	45.00
Precision Laboratories	Avianis DC	99.80
Precision Laboratories	Border Xtra 8L	100.00

Manufacturer	Brand name	% Active agent
Precision Laboratories	Protyx	100.00
Precision Laboratories	Speed	100.00
Precision Laboratories	Direct	100.00
Precision Laboratories	Import	100.00
Precision Laboratories	Gundown Max	100.00
Precision Laboratories	Exchange	100.00
Precision Laboratories	Transport Ultra	80.00
Precision Laboratories	Kixyt	100.00
Pro Solutions	ProSolutions Defoamer	10.00
Pro Solutions	ProSolutions 90/10 Surfactant	90.00
Pro Solutions	ProSolutions 80/20 Surfactant	80.00
Sanitek Products	38-F Drift Retardant Additive	32.00
Sanitek Products	41-A Drift Retardant Additive	30.00
Sci Protek	T-Mate	17.50
Sewer Sciences	Corn Foam	78.50
Southern Agricultural Insecticides	Home and Garden Spreader Sticker	100.00
Southern Agricultural Insecticides	Herbi-Oil S83-17 Spray Adjuvant	83.00
Southern States Cooperatives	Crop Oil Concentrate 83-17	17.00
Southern States Cooperatives	Crop Oil Concentrate 83-17	83.00
Southern States Cooperatives	De-Fac 820	80.00
Sterilex Corp.	Sterilex Ultra Activator Solution	4.90
Sterilex Corp.	Sterilex Ultra-Kleen Solution 2	4.90
Sterilex Corp.	Sterilex Ultra-Kleen Solution 2	6.00
Sterilex Corp.	Sterilex Ultra Activator Solution	6.00
Sterilex Corp.	Sterilex Ultra Activator Solution	6.00
Sterilex Corp.	Sterilex Ultra-Kleen Solution 2	6.00
Stoller Enterprises	Natur'l Oil	93.00
Taminco	Desikote	18.00
Voluntary Purchasing Groups	Hi-Yield Spreader Sticker	90.00
Wilbur Ellis Co.	Super Kix	83.40
Winfield Solutions	Corral Poly	30.00
Winfield Solutions	Destiny HC	92.00
Winfield Solutions	Fast Break	7.70
Winfield Solutions	Fast Break	2.30
Winfield Solutions	Heatwave	77.00
Winfield Solutions	Heatwave	23.00
Winfield Solutions	Inergy	100.00
Winfield Solutions	Interlock	100.00
Winfield Solutions	Level 7	65.00
Winfield Solutions	Noble	99.00
Winfield Solutions	Placement	100.00
Winfield Solutions	Placement Propak	45.20
Winfield Solutions	PowerLock	95.00
Winfield Solutions	Preference	89.50
Winfield Solutions	Prime Oil	83.00
Winfield Solutions	Prime Oil	15.47
Winfield Solutions	ProMark	38.00
Winfield Solutions	Rush	40.00
Winfield Solutions	Silkin	99.00
Winfield Solutions	Superb HC	92.00
Winfield Solutions	Top Surf	80.00
Winfield Solutions	Activate Plus	90.00
Winfield Solutions	Aduro	80.00
Winfield Solutions	Alliance	50.00
Winfield Solutions	Class Act Flex	60.00
Winfield Solutions	Class Act NG	50.50
Winfield Solutions	Complete Compatibility	60.00
Winfield Solutions	Complex	23.20
Winfield Solutions	N-Pak 28	28.00
Winfield Solutions	Transfix	96.00
Winfield Solutions	Inergy	100.00
Winfield Solutions	Aqua-King Plus	95.00
Winfield Solutions	Surf-King Plus	95.00
Winfield Solutions	Droplex	100.00
Winfield Solutions	Thoroughbred	99.00
Winfield Solutions	Brace	30.00
Winfield Solutions	Interlock	100.00

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